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MILTON'S PRACTICAL BEE KEEPER

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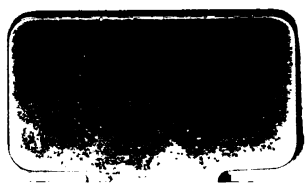

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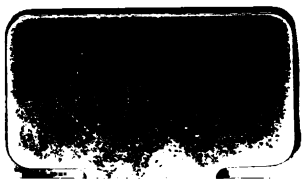

THE

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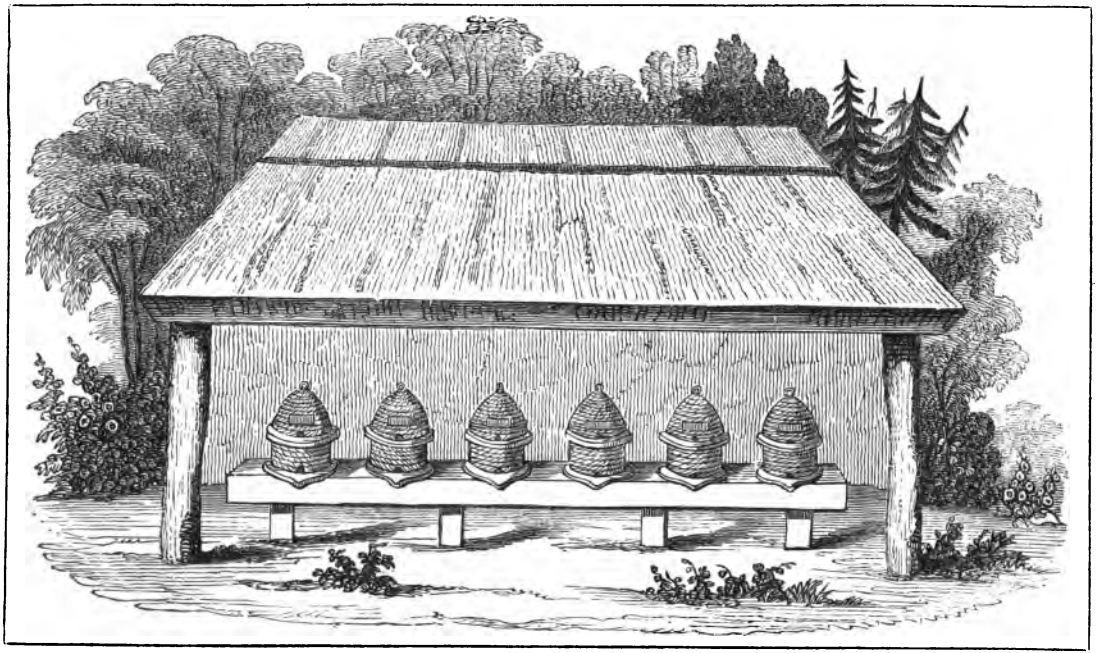


A Rustic Shed for Bees; or, an Apiary of small Cost.

THE

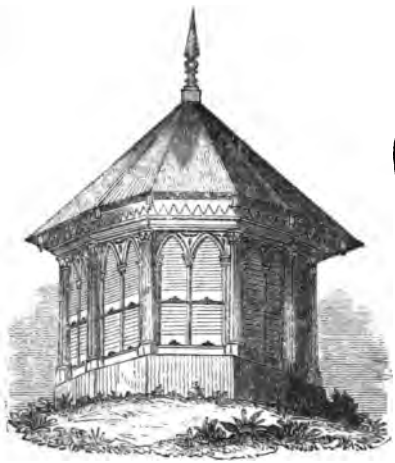
PRACTICAL BEE-KEEPER;

OR, CONCISE AND PLAIN

INSTRUCTIONS FOR THE MANAGEMENT

OF

BEES AND HIVES.



BODLEIANA BIBLIOTHECA

BY JOHN MILTON.

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M.DCCC.XLIII.

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THE

PRACTICAL BEE-KEEPER.

INTRODUCTION.

GENERAL CONTENTS.—OBJECT OF THE AUTHOR.—A NEW HIVE.—ANCIENT AND MODERN WRITERS ON BEES.—SIR CHRISTOPHER WREN'S HIVE.—INVERSION OF HIVES.—METHOD OF STUDY.

THE following pages contain a few concise and plain instructions for the management of Bees and Hives; my object being to state with clearness the easiest and most useful method, in the hope of promoting a general improvement in the cultivation, and preservation, of these valuable and interesting insects. My apology for adding my name to those of the many learned men who have written upon bees is the great interest I feel in the subject, as well as a desire to make an endeavour to promote bee culture.

Amongst other matters, I have introduced and described a new bee-hive. The inventor, an American, visited me several times during his stay in England. His hive has a peculiar shape, and a singularly con-

structed entrance, from both of which I consider we shall be able to effect advantageous changes in our English hives. I have also given numerous extracts from writers on bees, and a list of authors, ancient and modern, with which I have taken much pains in order to render it correct. Nevertheless I doubt not but there will be found omissions. The names of the ancients I have placed alphabetically; the more modern writers chronologically, which I considered would be the most simple arrangement.

Great was the interest that was entertained for these insects in ancient times. "Aristomachus, it is said, studied bees during sixty years. Philliscus retired into a desert wood, that he might have an opportunity of observing them to better advantage. Aristotle made a great number of curious observations on this insect, which Virgil put into Latin verse. These observations were enlarged and confirmed by Pliny and others. Theophrastus wrote upon the bee. Among the moderns the number of writers who have treated on bees is very great;" an evidence also of the interest which they excite at the present time. The University of Oxford, at a very early period, produced minds actively engaged in the study of bees, and continues to furnish a number of individuals, who delight in the same researches. It is generally thought that Dr. Charles Butler, of Magdalen College, was the first English author on bees.

But in an old treatise on bees, which is in my possession, Mr. Thomas Hyll is stated as being the earliest writer. His works, printed in black letter, commence in the year 1568, and reach to the year 1586. Mr. Edmund Southern also published a work on bees, in the year 1593, and in this are mentioned the names of other authors, all of whom wrote prior to Dr. Butler, for I have not met with any edition of his until the year 1609.

Upon looking over a very old book on bees, purchased at the late sale at Strawberry Hill, I was agreeably surprised to find that our great architect, Sir Christopher Wren, was a contributor to the subject, if not the inventor of a bee-hive, of which he has left an illustration and description. I have printed in this work a copy of his letter. It appears to me that Sir Christopher's hive is the original of one attributed to Mr. Thorley, who lived at Oxford a century after Wren. A writer in the same book recommends the use of an inverted hive. Is not this a proof that early writers about bees were acquainted with that plan which we now adopt?

I have endeavoured to point out the necessity of apiarian pursuits being directed so as to simplify the management of bees; and have also tried to show that we always succeed best when *nature and art are made to accompany each other.* This is Huber's remark, and

it must be attended to by every student. Man, in subduing animals, in some measure impairs the equilibrium established by nature amongst rival species, and more or less diminishes their energy and vigilance. We should, therefore, try to compensate them for the advantages of which they have been deprived; nay, must do much more, if wishing to augment their products. For we have to contend with nature, which assigns limits to the multiplication of individuals. It therefore demands us to possess a correct knowledge of the wants of the animal subjected to our use, and it is from them the art of managing them must be learnt *.

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* All the hives described in this work, as well as everything connected with the apiary, may be obtained at J. Milton's Italian warehouse, 10, Great Marylebone Street, Wimpole Street.

CHAPTER I.

IMPORTANCE OF THE BEE TO MAN; ITS THREE SEXES; ITS STING.—AGE OF BEES; THEIR INSTINCTS AND SOCIAL VIRTUES.—TEMPERATURE OF HIVE.—EMPLOYMENTS OF BEES; THEIR MODE OF TAKING REST.—CELLS OF COMB.—RETINUE OF QUEEN.—TRANSFORMATION OF EGGS AND LARVÆ.—ARTIFICIAL FEEDING.—SITE FOR APIARY.—SEASON FOR THE ESTABLISHMENT OF AN APIARY.—ADVICE TO THE BUYERS OF BEES.—REMOVAL OF STOCKS.—METHOD OF UNITING SWARMS.—PASTURAGE FOR BEES.—SWARMING.—HONEY.—BEE-BREAD.—IMPORTATION OF WAX AND HONEY.

Bees are a race of insects highly entertaining to the naturalist on account of their peculiar manners, habits, and instincts, and important to the economist in rural life by reason of their valuable produce. Under the indiscriminate term of common honey-bee we comprehend what are severally named the queen-bee, or female; male-bee, or drone; and working-bee, or neuter. The natural history of the common bee has been more fully considered than that of any other creature of the insect tribe; and, if we except the silk-worm, and coccus, employed in dyeing, there appears to be none more deserving of the regard paid to it. As an object of advantage the honey-bee has been deemed,

by the common consent of mankind in all ages, of sufficient consequence to be particularly attended to.

"There are in every hive, or colony, three sorts of bees; first, the queen, or female; secondly, the drones, or males; and the working-bees, or neuters. The queen is larger than the others, and is armed with a sting, which, however, she is seldom provoked to use. The drones have large eyes, and are destitute of a sting; the working-bees are armed with a powerful sting, which they are easily provoked to use in the neighbourhood of their hive. They have fifteen joints in the antennæ.

"The sting of the bee is a curious weapon, adapted to the industrious habits of its life, which expose it to a multitude of dangers. It is truly an instrument in every manner calculated for offensive, or defensive, operations in the annoyance of its enemies. The wound which the bee inflicts with its sting is severe to its little antagonists. It oftentimes proves mortal, because it not only strikes deeply into their bodies, but conveys, at the same time, a powerful poison into the wound which it occasions.

"In the queen the sting is longer, as well as stouter, than in the working-bee, and it is bent a little under her belly. When the bee means to sting it flies about the object of its anger very quickly, and by the velocity of its motions seems to evade being struck or attacked

to advantage, while preparing for the assault. The sound emitted at this time is also peculiar, and to those accustomed to bees is perfectly well understood. The danger of being stung by bees may be in a great measure prevented by a quiet, composed behaviour; but, if the attempt is made to molest, or beat them away, we are sure to be the sufferers. It has been affirmed that a person would be in perfect safety in the midst of myriads of bees if he were to keep his mouth carefully shut and breathe gently through the nostrils only, the human breath, it would seem, being peculiarly offensive to their delicate organs." There are several remedies for the cure of a wound inflicted by the bee, none of which are better than oil and laudanum in equal parts.

Writers are not agreed as to the duration of the term of life in the honey-bee. Among the ancients it was thought to extend to nine or ten years; Virgil, and Pliny, limit it to seven. Some suppose that they are annual; others that they live many years; but the latter idea is, at this time, almost exploded. On the other hand, although they may be considered as annual, a few of the queens certainly live through the winter, and lay the foundation for a new society in the ensuing summer.

Among those who have minutely treated on the subject of bees, many have related very wonderful and, in some instances, incredible circumstances. They have

been celebrated for their prudence, industry, mutual affection, unity, loyalty to their sovereign, public spirit, sobriety, and cleanliness. The sagacity of bees in foreseeing rain, or cold, has been often mentioned. Bees require a considerable degree of heat; the eggs must be kept warm, and neither the larvæ nor chrysalises, it is asserted, will live at a temperature so low as 60° or 70°. The industry and activity of bees in their domestic labours afford a very instructive and amusing spectacle; all are busily engaged in their several departments. While some are employed in gathering honey and wax, others repair the combs; others carry out the dead, and cleanse the filth; others again keep guard, placing themselves in five or six files, eight or ten deep, upon the floor of the hives, so that all bees that enter must pass between them; some are even said to serve for bridges, or ladders for others to pass over; and when they are tired with labour they recruit themselves with rest. For this purpose they form larger or smaller clusters in the following manner:—Each bee, with its two fore-legs, lays hold of the hinder legs of the bee that is next above it, and thus a chain is formed by the successive application of one to another, and the first bee supports the weight of all the rest to the bottom of the chain. The bees, it is said, never lay hold of any part of each other except the hind legs.

The cells designed for the working-bees are commonly

half an inch deep; those for the drones, three-quarters of an inch; and those which are intended to contain honey only, are still deeper. The queen is generally concealed in the most secret part of the hive, and is seldom visible, except when she happens to lay her eggs in such combs as are exposed to sight. When she does appear, she is always attended by ten or a dozen of the common sort which form her retinue, and follow and guard her wherever she goes. In the space of eighteen or twenty days the whole process of transformation is finished, and the bee endeavours to release itself from its confinement by forcing an aperture with its jaws through the covering of the cell. The passage is gradually dilated; so that one of the maxillæ, or jaws, appears first; then the head, and afterwards the whole body. This is usually the work of three hours, and sometimes of half a day. The bee, after it has disengaged itself, stands on the surface of the comb until it has acquired its natural complexion, and is soon ready for labour.

The preservation of these industrious and useful creatures deserves every consideration. This depends chiefly upon supplying them with a sufficient quantity of food, guarding them from their enemies, and despoiling them of the produce of their labour without destroying them. Besides the attention which should be bestowed upon he necessities of bees, the choice of an eligible situation or the apiary is of great importance. It may be neces-

sary to feed them towards the end of autumn, in the winter, or in the spring, when they have consumed their winter stock.

The Situation of an Apiary requires much consideration. It should be placed in a quiet and moderately retired place, sheltered from high winds, and protected from anything likely to disturb the bees. Damp atmosphere, arising from dews, &c., is very prejudicial; therefore the sooner the hives are relieved from its influence the better. From this consideration I would let the hives receive the morning sun, but I would not place them due east. Some observations made by Mr. Hoy, an experienced apiarian, are worthy of attention. "Mind in placing your hives that the sun does not shine upon them in the honey-collecting-time. For if your box-hives are set upon a stand (the same as a common hive in a garden), where the sun has great power, it will heat the bees so much that they will lie outside all day, and be idle; neither will they go in until the cool of the evening. Besides, it often melts the combs, so that they break and destroy the bees." We know that extreme cold chills and suspends the animal spirits. Heat, on the contrary, stimulates activity. Therefore it will be necessary to avoid exposing your hives to these extremes of temperature.

There exists much difference of opinion as to the best

time for stocking a bee-garden. I think that the most favourable season to establish an apiary is about February; but a week before or after, in some years, will not be very material. The combs are, at this time, empty of brood, and light of honey; the removal in consequence is safe and easy. Another important consideration favouring the choice of this season of the year is, that those hives which have survived the winter are not so likely to die, unless there should follow some carelessness in removing, or neglect in feeding them. Poor and weak stocks undoubtedly require to be fed at this early period of the year.

But Mr. Keys, an apiarian of much experience, and whose opinions have great weight with many bee-keepers, says, "The best time for establishing an apiary is just before the taking-up time, which is generally about the end of August; for then bee-keepers reserve as many of the best stocks as they judge will be sufficient for the next summer's supply. Therefore, after this period, they are not disposed to part with any, unless at very advanced prices. Whereas, by purchasing a little before, or a little after, this time, a choice can be made of the best stocks, and at the usual prices."

Stocks should be selected by competent judges, for weight alone must not be relied upon. They ought, however, to weigh twelve pounds and upwards in February, and twenty pounds and upwards in the autumn.

The number of the bees also must be observed, and the combs should look fresh, and be of a moderate yellow colour, and be worked nearly to the bottom of the hive. These are such as may be chosen with safety. .

When your stocks are brought home, set them in your bee-house, or garden, where you intend them to remain, so that they may not again be disturbed; taking care also to keep them dry. The next day plaster* the hive round the bottom to the board on which it is to stand, leaving a hole, for the bees to enter, about half an inch high, and one inch long. The evening is the best time for removing stocks. If the floor, or resting-board, on which the hive stands is a fixture, the hive should be raised with wedges, two or three hours previous to its removal, in order to let in air. This will drive the bees up into the hive; otherwise many will remain on the board, and prove very troublesome, or perhaps be entirely lost. But if the board is moveable, pin a card, pierced

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* I like to see this plaster round the bottom of the hive. It is an outward sign of care and attention; and when it is done neatly, (namely, plastered, and then painted,) it helps to keep out small insects, and in the spring facilitates the hatching of the young. It is not required during the greatest activity of the bees; but, in the autumn, it indicates that they have received that attention so justly due to them, after having worked so hard for our profit. It also shows that they are to remain unmolested until their own instinct again calls them into activity for our service.

with holes, over the entrance of the hive, which will prevent the bees from coming out, and likewise give them air. Secure the hive firmly to the board, and then it will travel any distance. If the season is too far advanced for purchasing stocks, the first swarms should be chosen. Second swarms, or *casts*, are not worth keeping unless two or three be united together.

The following method of uniting swarms, or of returning them to their original hive, will be found convenient in practice.—Swarms, if possible, should always be united on the evening of the same day that they have issued from the hive. For their temporary abode place them in a hive that has an opening on the top, and cover this with a piece of perforated tin, or coarse cloth. Hive the swarm in the usual manner, and late in the evening bring it near the hive you wish to reinforce. The cloth being ready, knock the swarm on to it, quickly placing over the bees the hive which you wish to contain the extra inmates, and as soon as convenient return this to its former position. There are, however, other ways of obtaining the same end. Bees recognise one another by smell; which circumstance may be taken advantage of in the following manner. Put into a small flower-pot half the contents of a pipe of tobacco, or half a cigar lighted; set this into a common pail, and over it invert the hive which contains the swarm. Then place the other hive on the top of this; the smoke will conse-

quently ascend through both and make all smell alike, and the bees will generally be received amicably with the loss only of one queen. The temporary hives which are used in this process should have holes at top to prevent the suffocation of the swarm.

I am not one of those who think that it is of no use to cultivate flowers for bees. There is great pleasure in assisting these industrious insects, and in watching them in search of food from flower to flower. I am aware that we can only produce their food in patches, and that for the principal supply we must look to extensive tracts. For the production of large quantities of honey, there must be grand resources, and a favourable season. But still we may add to these resources. Mignonette has always been a favourite flower with bees, also borage; which last is called the king of bee-flowers. Another, equal to these, and which deserves to be called the queen, is the *Phacelia tenacitifolia*. Some seed of this plant was given to me a few years ago, by a gentleman, for trial. It is an annual, grows freely without much cultivation, and I consider it a valuable addition to our stock of bee-flowers.

Flowers which are favourites with bees in some situations, are in others passed over by them with apparent indifference. This shows that climate, soil, and season, have more influence in adapting flowers to bees than many persons would imagine. Honey partakes of the

fragrance and taste of the flowers that are most abundant at the time when it is taken. As a proof, I visited my apiary, about twenty miles from London, and took from a cottage-hive a glass of honey, and was bringing it to London in the stage coach, when a lady inside remarked that there was a very powerful smell of mignonette. Upon this I uncovered my glass of comb, and soon satisfied her from whence it arose.

Those who have paid attention, and watched the bees, must have remarked that this simple, but elegant and fragrant flower is an everlasting resource to them. No sooner is it quitted by one bee than another and another immediately succeeds in search of the nectar and farina.

Bees like best those places where their favourite flowers most abound, such as fields of beans, of buck-wheat, and of the never to be surpassed Dutch clover. It is here we can listen to their busy and joyful hum of delight, and be in our turn also delighted. They do not fly far in search of food, not often more than a mile, and always return with great precipitation to the hive upon the approach of rain or a storm.

> Swarming next appeared,
> The female bee that feeds her husband drone
> Deliciously, and builds her waxen cells,
> With honey stored.—MILTON, *but* NOT *the Bee-Keeper.*

A swarm of bees is one of the most beautiful and

pleasing sights that can be imagined, or beheld. The hum, buzz, and activity, which is diffused throughout the apiary, at this time, is more easy to be conceived than described; it really seems as if this was the most important period in their lives, for the apparent stir is not confined to the one hive from which the swarm is to proceed; the whole seeming to partake of the excitement. The exact cause of a hive sending out swarms has not yet been satisfactorily explained; and until we are more accurately acquainted with the economy of these insects, I do not think that we can arrive at safe conclusions. But from whatever cause, or causes, it proceeds, it is certain that it is natural to the insect in this, as well as in every other country, whether in a wild, or domestic state.

Every swarm is composed of a queen, a number of common bees, both old and young, and an uncertain multitude of drones. Some have supposed that those swarms which have the greatest number of drones are the most likely to prosper; but this has been controverted by others.

The multitude of swarms does not forebode the prosperity of an apiary; neither do those earliest swarms, such as those that rise towards the latter end of April or the beginning of May, prove the best, or prosper most. But those that happen at the latter end of May, or beginning of June, are the most promising. If a hive

has continued well peopled during the winter, the swarm will leave early in the spring; but, if it has been but thinly peopled, the inmates will not leave until the middle of June.

The two principal swarming months are May and June.

The first sign of swarming is, when the hive is so peopled that many of the bees cannot find room within, but stand in clusters on the outside of the hive. Another is, the appearance of a large number of drones, especially if the weather be clear, calm, and warm; for in a cloudy, wet, and stormy season, the first swarms seldom or never rise, (though the *casts*, or second swarms, often rise in indifferent weather.) These, however, are not certain signs, nor do they point out the very day of the emigration; but there is one which declares it very punctually, and this is, that when the hive is very full, and the day very fine, yet very few bees go out in search of honey. In this case it is certain that they are assembling themselves in the hive, and preparing to be gone in a very little time.

If a person go near the hives that are ready to send out swarms, in the evening, or even in the night, he will hear a sort of humming noise in them, which is not perceived at such times on any other occasion. The whole society is in agitation on the occasion, and the tumult does not cease till the new colony has gone forth. The hours of the going out of swarms are gene-

rally between eleven in the morning, and one or two in the afternoon. People who have the care of bees should attend to their movements on these occasions. If they are not at leisure to watch them in the hours before mentioned, they should defend the hives during that part of the day from the heat of the sun, that they may not go off and be lost. When the time of a swarm's going forth is expected, care must be taken to have a hive ready to receive them. Should the swarm settle upon some branch of a bush or low tree, the hiving of them is an easier matter than one might imagine. Some low bushes in view frequently determine the bees to low flights*. When the weather for some days after swarming is unfavourable for the bees going out, they should be fed with care until it is fine, otherwise there will be great risk of the young swarm dying or being destroyed. The most important thing to be observed to the attendant upon a swarm, is, that he be calm, collected, and quiet, and that he avoid breathing upon the bees.

History, both ancient and modern, proves the value and esteem in which honey has been held through every

* I have adopted with success the practice of sprinkling some sweet liquor upon a dwarf tree or shrub, in order to entice a swarm, or its scouts, to settle upon the spot most convenient for hiving. This plan answers exceedingly well in the gardens near the metropolis, where I kept bees.

age. Sacred history abounds with examples, and shows it by frequently estimating the value of countries by the quantity of honey they produced. "A land flowing with milk and honey," was the glory of all lands. Honey was the sugar of the ancients. Egypt, Greece, and Rome delighted in it. The latter has handed down to its posterity the same taste for it. In no country is honey more liked than in Italy, and the isles of the Mediterranean. The confectionary of these countries largely partakes of it, notwithstanding the more recent introduction of sugar. Honey is produced in every quarter of the world, and to an industrious and intelligent rural population it would be found a great acquisition.

"Honey, as it is collected by the bees, is a perspiration of the sap of plants in particles which exude through the pores and condense on the flowers, or leaves. It has been inferred, from careful observations, that the bees make no alteration in the honey, but discharge it into their magazines or cells just as Nature produced it on the flowers." That honey partakes of the flavour of the flowers from which it is derived there can be no doubt, or that the newest is the best; but as to its taste and quality there is a variety of opinions.

In order to obtain it from the combs in a pure state, it must be left to run without pressing, which it will do if you cut through the honey cells. The fact of our

native honey being so various in flavour, is in exact accordance with that obtained from foreign parts. Having dealt very largely in honey for many years, I will venture to offer a few remarks upon it, beginning by describing that which has been so long the favourite, and which obtains the highest price in the London market. *This is the Minorca honey.* It partakes of the flavour of orange flowers, is of a light gold colour, rather granulated, does not set very firm, and will keep for a long time. It is imported in curiously-shaped jars, having four short handles. Some of these hold four pounds, others eight or ten pounds. This honey is usually sold at 2*s.* 6*d.* per pound.

The *Narbonne honey* owes its flavour to the many aromatic flowers that abound in that part of France, such as the wild thyme, rosemary, &c. This is much whiter than the Minorca honey; some of it is of a fine pale straw-colour; but it is seldom found granulated. This is also imported in curious-shaped jars. A person staying in Narbonne sent me a jar, which was shaped like an egg, and held 400 pounds of honey. The price of real Narbonne honey is 2*s.* per pound. There is a white honey, very similar to this, but more granulated, which comes from Caen in Normandy. It is imported in casks and jars of various sizes. These are made of a peculiar kind of clay, and in form are not unlike the old Roman pitcher. This honey is frequently

sold as Narbonne; its price is from 1*s.* 6*d.* to 1*s.* 8*d.* per pound.

The valley of Chamouni is known to produce remarkably fine honey, which has a very agreeable taste. No one flavour predominates. In this, I think, consists its adaptation to most palates. It is sent to us in very tastefully-constructed wooden vessels, or casks, and is sold at 2*s.* 6*d.* per pound.

West India honey comes chiefly from Jamaica. They import it in casks, some of which are of great weight. It is of an excellent quality, rather granulated, and is much liked in England. It is sold at 1*s.* 4*d.* to 1*s.* 6*d.* per pound.

East India honey is imported in bottles, in shape like those which are used for the German wines. It is very fragrant, of rather a dark colour, and is not much esteemed in England, perhaps on account of its very powerful flavour. I have never seen any of this honey in a firm state. The bottles are sold at 5*s.* each.

Seville honey possesses a delicate almond flavour, and never becomes firm; but remains thick and glutinous. This peculiar property it retains for a great length of time; and, I believe, never changes in this, or any other climate.

The honey imported from the vicinity of the Pyrenees partakes of the flavour of the raspberry. There is no doubt but that this is caused by the bees frequenting

the blossoms of this plant. It is a choice honey, and is esteemed for its delicate flavour.

We receive very large importations of honey from Germany; but I am not aware that the honey of that country possesses any remarkable quality.

Honey is produced in great abundance in Russia, where there is, in fact, a separate market for it. One kind of Russian honey is very peculiar, and whiter than any other; it is of the flavour of penny-royal, which, with various other aromatic herbs, grows very luxuriantly in a wild state in the woods and wastes of this vast and partially cultivated country. When only slightly flavoured, this honey is agreeable; nevertheless, it is but seldom eaten by epicures. It is imported in casks turned from the stems of solid trees.

I have now mentioned many kinds of fine honey; but I think there is none that surpasses our fine English, particularly that which is obtained while the Dutch clover is in flower. This plant, so serviceable to bees, is universally sought after and frequented by them; it continues to bloom for many months, and is found in great abundance nearly all over our island. The honey that is collected on the borders of Oxfordshire and Hampshire, may be compared with that of warmer climates. Hertfordshire and Cambridgeshire produce it alike equal in quality; and, in fact, I know of few counties in England that are exceptions.

The honey obtained from the vicinity of extensive heaths (such as from Bagshot Heath, &c.) is mostly coarse and strong-flavoured. We also receive honey of the finest quality from Northumberland and from the Highlands of Scotland.

I must not forget a substance that is found in hives, namely, bee-bread. This has been a point of contention to writers in endeavouring to prove to what purpose the bees apply it. It spoils all honey with which it is mixed. Therefore those who wish to obtain honey pure, and of exquisite flavour, must carefully avoid every particle of bee-bread.

The importation of wax in the year 1839 was 6,314 cwts.

Of honey	in 1838	675 cwts.
Of wax	in 1841	4,483 cwts.
Of honey	in 1841	3,761 cwts.

The value of honey imported last year (1841) was 12,000*l.* —*Quarterly Review*, December 1842; which also contains a very interesting account of bees.

The Common Cottage Hive, on board.

Cottage Hive, with Cap and Board.

CHAPTER II.

ON HIVES IN GENERAL.—THE COMMON STRAW-HIVE.—THE COTTAGE-HIVE, WITH CAP AND BOARDS.—ENEMIES OF BEES.—STRAW-HIVE, WITH REVOLVING TOP.—THE BOX-HIVE, WITH INTERIOR BOXES.—AN IMPROVED HUBER'S, OR LEAF-HIVE.

BEE-HIVES, in different places and on different occasions, are of very different materials; but the most usual form is conical, or bell-shaped. Persons of speculative dispositions have at all times been desirous of seeing what passed in the hive, and of observing these industrious insects at their work. For this purpose the ancients contrived a method of placing certain squares, or panes of a transparent matter, such as horn, or the *Lapis Specularis*, or isinglass, in some parts of the hive; through which they might see all that passed within. This practice of the ancients seems to have been first

revived in our country in 1653, by the Rev. William Mewe; as appears from his letters to S. Hartlib, Esq., who published them in 1655. Neither Dr. Butler, nor Dr. Brown, in the description of their hives, mentions windows of any kind. But Sir Christopher Wren describes his transparent bee-hive as consisting of three octagon boxes, for storyfying; each having a window with shutter on hinges, and a lock. Another very important point was, that each box had a lining of matting, or straw. Gedde, Warder, and Thorley, succeeded Wren, and each describes boxes with windows and shutters. The Rev. S. White, also, in his description of his boxes, describes them as having windows and shutters. He placed these boxes collaterally.—The principal advantage derived from hives of this construction, is that of obtaining the honey and wax without recurring to the barbarous expedient of destroying the bees.

The common straw-hive is so well known that it will require but little comment, excepting on some few points, which, to those who use it, may be found serviceable, and should be observed. Care must be taken that these hives are made of good and clean straw, and that they are also of a suitable thickness, for some are made so thin and loose, that it takes the bees two or three days of their valuable time to render them fit for use.

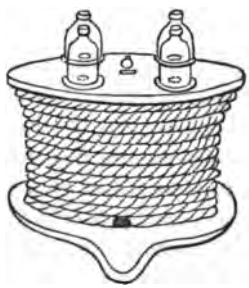
I think it advisable to have all your hives nearly the same size as possible; say, about thirteen inches in

diameter in the clear, and ten inches high inside. The old plan of rubbing the inside of the hives with beer and sugar, or with honey, is beneficial. It entices and amuses the bees, and they take to them quicker. Some put sticks across the inside, thinking they strengthen the combs, which is true; but, then, the bees build in so many pieces, and so irregularly, that when you wish to take out some of the combs you cannot fail to break them. Therefore, I do not like this practice; unless, indeed, at any time you want to remove your hives to a great distance.—A good swarm will, or ought, to fill the hive to within two or three rims of the bottom. When you have placed the hive where you intend it to remain, nothing more is required but to shelter it from the rain and wind. For if once the wet penetrates the hive it affects the combs, and the bees, getting a distaste for their home, will work but slowly, and not unfrequently they will desert it altogether. On the contrary, if they have a hive to their liking, they will soon furnish it with comb and honey.

"Dr. Bevan observes, that the hives should be placed on separate stands, supported by single posts or pillars, and be raised from the ground eighteen inches or two feet. They should also stand four feet apart, and quite clear of any wall or fence."

The resting-board should project several inches in front of the hive, in order to allow the bees plenty

of space to alight upon. It is scarcely needful for me to add, that the hives should be secured to the stand, so that, in case of accident, they may not be thrown down. One of the fatal accidents to which this kind of hive in particular is subject, occurs through covering it with a hackle, or turf. It is this that entices their enemy the mouse, who makes his nest on the top, and ultimately eats his way through the crown of the hive, destroying both comb and bees. About August the robbing of bees by wasps commences. This is often unnoticed, or but slightly regarded; it may, however, in some measure be prevented by making the entrance of the hive smaller. During April a large wasp may be frequently observed; she is the mother of the intended brood, and if you succeed in killing her, you will prevent many thousands of these enemies to bees.



Straw-Hive, with revolving Top.

The straw-hive with revolving top is of simple con-

struction, and easy management. It is made to support four bell-shaped glasses on the top, which are readily removed, when filled. It also keeps the bees more secure during the months they are not occupied in providing for the support of the hive. Some hives similar to these were used by Wildman, but they were destitute of the revolving top*. By these revolving hives we obtain the finest honey at all periods of the honey gathering. They are also useful for working the bees out of any old or decayed hives. Their construction obviates the necessity for smoking or driving, or, in short, of using any but the most gentle means.—I wish to impress this upon the mind of the apiarian; for however much we may be able to control these tiny insects, we must do so as gently as possible: I have found by experience that the most trivial alteration, if done at a critical time, *i. e.*, during certain stages of the

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* In the year 1826, the Society of Arts, Commerce, and Manufactures awarded me a Silver Ceres Medal for the invention of this double revolving top. I have always used it, and am not aware of any straw-hive that offers so many advantages as this. It requires neither smoke, nor fumes of any kind, nor is there any necessity to drive the bees. When you wish to get them from another hive into this, simply place the former upon the top, taking care that there may be but one entrance. The bees will then go down into the hive without your using any irritating means.

brood, will totally change, nay, perhaps entirely destroy their means of perpetuating their species.

A given number of days is required by them to produce young. This also depends in a great measure upon the temperature of the hive, as well as upon the attention of the bees. Therefore, if a sudden disturbance or alteration is made, it may possibly interfere with the regularity of the process. One of my experiments so disturbed the economy of the hive, that drones only were produced.

The following directions should be attended to:—

To put a swarm into the hive, turn the board on the top so as to entirely cover the holes in the one underneath, and screw the thumb-screw tight; then hive the swarm into it, and as soon as the bees are settled, remove it where it is to remain permanently, whether in a garden or bee-house.

The glasses should then be placed on; loosen the thumb-screw, and turn the upper board so that the holes may correspond with those in the lower. Thus the bees will be admitted into the glasses, and will commence building combs.

Plaster the glasses to the hive with a little mortar. This keeps them firm. The bees always do this on the inside with a kind of gum, or resin, which they apply for this and many other purposes.

The glasses should be kept covered with a common

straw-hive for two or three days without being disturbed. You may easily know when the glasses are full of honey by the cells being sealed. When you wish to take away any of the full glasses it is not requisite to turn the board, but merely with a knife remove the plaster outside of the glass and then put the knife underneath and loosen it from the board. Take it away on a zinc plate, remembering to replace an empty glass or glasses over the hole, or holes, immediately. The middle of a fine day is the best time for removing full glasses. The second glasses are often more speedily filled than the first, sometimes even in a few days. I must not forget to mention the season of the year when it will be advisable to desist from working the bees in glasses or caps, otherwise the parent hive will become impoverished. It is not desirable, in most seasons, to take away honey in this manner after the end of July; because the remaining part of the season sometimes proves unfavourable for the bees, and prevents them from procuring a sufficiency of honey for their winter support. Therefore, about this time, remove all the glasses and caps, turn the board and fix the screw. This will leave them in safety for the autumn and winter months. Glasses that are only partly filled with comb should be carefully put by to be again placed over the holes in the following April.

Should the bees require feeding, these partly filled

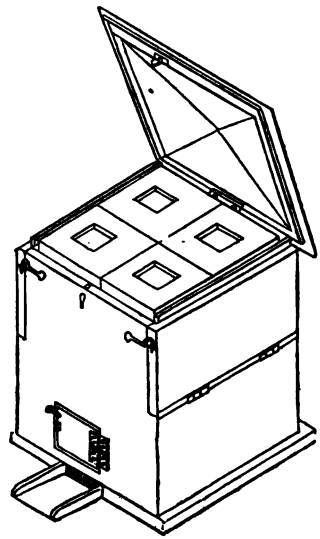
glasses will be found very useful for the purpose. April is the usual time to commence placing on glasses and caps. The stock-hive is, at this period, full of combs and brood; and if the season proves favourable, you may expect to have your glasses filled several times, and likewise the same every corresponding season.

The management of hives in this manner does not hinder the bees from swarming. Therefore you can still increase the number of your hives.

Honey obtained by means of glasses fresh from the hive will be of the finest quality and perfectly free from young brood. It will possess the flavour and fragrance of the flowers, then in blossom; it will be clear, and far superior to that taken from common hives. An essential quality that this hive possesses is, that honey can be taken at pleasure, without injuring the bees or resorting to that painful process of partially killing them by fumigation; which last deteriorates the quality of the honey.

A few years ago I received, from a gentleman abroad, a model of a bee-hive, which assisted me in constructing the *Box-Hive with interior Boxes*. This, like most other hives, has undergone a great many changes and modifications before it could be brought to its present state of efficiency. It is now acknowledged, and most justly, as the best hive for practical utility. Its form is that of a square, having angles inside, which nearly complete

a hexagon. It is divided through the middle by a board, on which rest four small boxes for the bees to work in. These can readily be removed when filled. It forms a complete dwelling for the bees, and the whole is under lock and key, which secures it from idle curiosity.

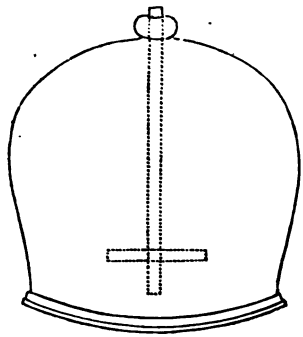


The Box-Hive, with Interior Boxes.

Its management is very easy. To place a swarm in this hive, it is requisite to stop the four holes with bungs. After the bees are hived and settled, place the hive where it is to remain. Remove the bungs, one at a time, and place over the holes the small boxes. This

may be deferred for six or more days, if more convenient. There are two dividers to be used when you wish to take away a full box, and this is done with much ease.

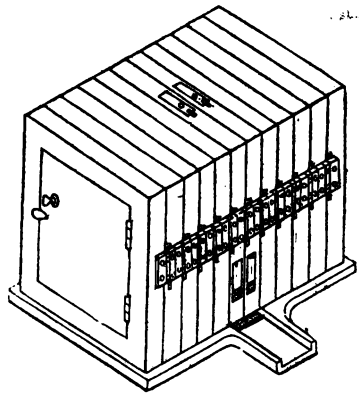
Bell glasses may be used instead of the four small boxes if preferred.



The Bell Glass.

The Huber or leaf-hive, which I now wish to submit to the public, is much improved by my own practice and experience. It combines all that is deemed requisite for affording the apiarian opportunities of pursuing his researches in order to discover the hidden secrets of this wonderful tribe. This hive is composed of eight vertical frames, the material of which is cedar-wood of a suitable thickness. The frames are about ten inches in height, nine in depth, and one and a quarter in width, the two centre ones being rather wider than the rest.

The whole is very exact, and its proportion in accordance with the habits of the insect.—Each frame has a pair of hinges; in the whole there are twenty-four pairs. There is a glass window in each end, and two smaller ones in the centre; also openings on the top for the purpose of withdrawing humidity. These openings also afford opportunity of working the bees in glasses, and of feeding them when necessary. By means of the windows, and the facility with which the frames are opened, the interior of the hive may be inspected when in full operation.



An improved Huber's or Leaf-Hive.

There is not much difficulty in placing a swarm into this hive. It should be done in the following manner. First hive the bees into a common straw hive. If this

is done in the day-time let them remain there until nine o'clock in the evening. Then spread a cloth and place upon it a brick; strike the hive containing the bees rather sharply down upon the brick. The bees will fall on the cloth, upon which place over them immediately the huber-hive, taking care it is raised on one side by the brick; this will prevent any of the bees from getting crushed, an occurrence at all times to be carefully avoided. After a short time the huber-hive can be removed to where it is to remain. It is as well to tie the huber-hive round with a piece of string, as a security for keeping it together while the operation of hiving is performed. It should also be rubbed with a little honey.

French naturalists are justly proud of the indefatigable Huber. They regard him as the most accurate depictor of the domestic economy of the bee. He assisted to remove many vulgar errors, and his discoveries and statements have often been confirmed, and are at this time well established.

Nevertheless, are we to rest inactive, and to feel satisfied that Huber has done all that can be done, and that his leaf-hive is perfect? For my own part, I was determined to try further experiments in order to render it more practicable. The success, however, of my experiments for a long time was very slow. From the year 1826 to 1830 the chief complaint against leaf-

hives was, that, the bees did not work their combs parallel with the frames, an object very important, and the most desirable to be accomplished. In order to effect this, I conceived the idea of affixing to each frame a recess, in which I placed a prominent bar, thinking that it might act as a guide. This partly succeeded, but in a year or two I had the old complaint, that the combs were still not worked straight. It remained in this imperfect state for some time, when I was resolved again to try the effect of raised bars, forming salient angles. This seemed to offer success, but after several trials my friends pronounced that the leaf-hive was a capital hive, *only the bees would not build straight.*

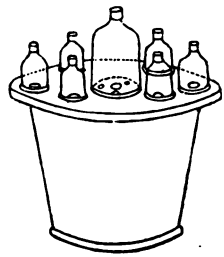
However, I am happy to say I have at last succeeded in overcoming the difficulty, which I did by placing upright guides in addition to the salient angles. I have likewise constructed a different *entrance;* with these alterations the hive can no longer be termed a genuine Huber. It may with truth and propriety be called the HIVE OF MANY NATIONS, for it now consists of parts from England, France, and America.

This ingeniously-constructed hive, if not quite perfect, will be found to answer the main purposes of every other, and by it may be realized the principal advantages obtainable from other hives. It is also the best for obtaining artificial swarms. By this hive the

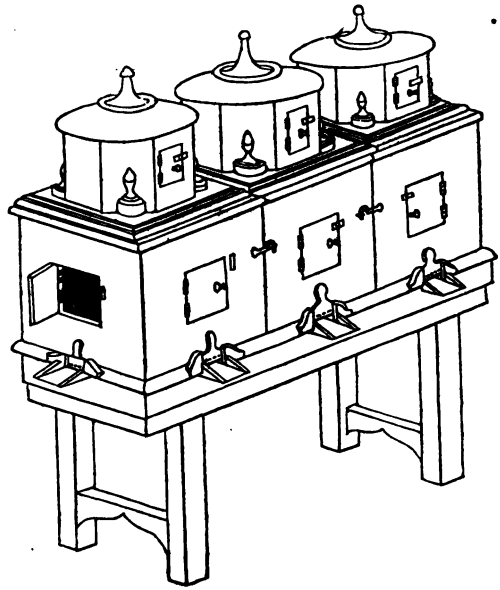
bees might be made to ring a bell, when they swarmed, and also, by a simple contrivance may be obliged to enter and leave the hive by means of a fly-wheel. By this a close observer could count their number, and consequently would know how many entered and left the hive in a given period.

"In your presence," says Huber, "I have opened all the divisions of the most populous hives, when the tranquillity of the bees has given you great surprise. When I observe that bees may be rendered tractable, I conceive it need not be added, that I do not arrogate to myself the absurd pretence of taming them. I ascribe their tranquillity on opening the hives to the manner in which they are affected by the sudden admission of light. They appear rather to testify fear than anger."

Cap to Hive.



Cylinder Glass, with Glasses on the top.



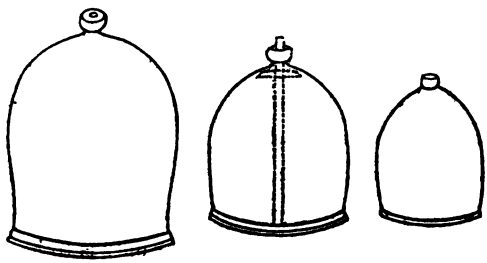
A Stand with three Hives placed side by side.

CHAPTER III.

MINIATURE APIARY.—UNICOMB OBSERVATORY HIVE.—STORIFIED BEE-BOXES.—WHITE'S COLLATERAL HIVE.—PREVENTION OF SWARMING.—THE MORETON HIVE.—HEXAGON HIVES.—MR. THORLEY'S OCTAGONS.

I WILL now describe a stand with three hives, placed side by side, which may be considered a complete apiary in miniature. Each box will contain a full-sized swarm. There is an opening on the top of each, for the purpose of placing over bell-shaped glasses to be filled with

honey. These openings are likewise very useful for feeding the bees; and they can also be occasionally used for withdrawing the humidity from the boxes. There are ornamental covers for the glasses, with windows in them, through which you can inspect the bees when at work.



Bell-shaped Glasses.

Besides the usual entrances, there are two others; one at each end, which, under some circumstances, will be found desirable, and when not required, can be easily stopped. The case is altogether substantially made, and is well adapted for being placed upon a lawn. Should it at any time be thought desirable to work the bees on the collateral system, a communication can be made from one box to another; it will then answer the purpose equally as well as those boxes which are made solely for that end.

Each box has a little drawer underneath, lined with zinc, which has a perforated slide for feeding the bees;

this also admits of the Apiarian practising ventilation, if he wishes to try the experiment.

In a word, this little apiary in miniature is exceedingly ornamental, very useful, and is calculated to withstand all weather. Nevertheless, I recommend the use of some temporary shelter, which will not only be agreeable to the bees, but also be found very convenient to those who may wish to watch the movements and industry of the busy tenants. If placed upon a lawn or grass plot, the frame should be let into the ground, and firmly secured by nailing the posts to *sleepers* (a term used by carpenters and bricklayers).

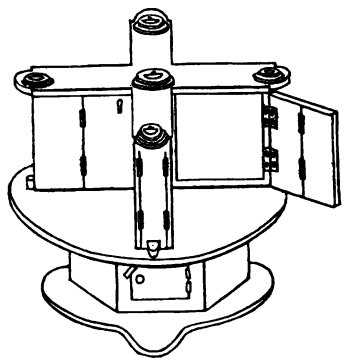
In hiving a swarm, the middle box only is to be used, if for collateral practice. It should be rubbed inside with sweet liquor; and I need scarcely observe that a bung ought to be placed in the opening on the top. The rest of the management is the same as that of most other hives.

The Unicomb Observatory Hive. The means of obtaining this hive was afforded me by Mr. Jesse, author of that interesting work, entitled *Gleanings in Natural History*. In the year 1828, this gentleman kindly assisted me in procuring hives as patterns.

This ingeniously-constructed hive, perhaps more than any other, affords the apiarian an opportunity of frequently seeing the queen-bee.

It is composed of two distinct parts, the lower of

which is a box with hexagonal sides, having a window in the back; the top of the box is flat, and has an opening, or round hole, in the centre. Upon this rests the other part, which is in shape like a *cross*, and is made to revolve. It is so exact in proportion, that it enables



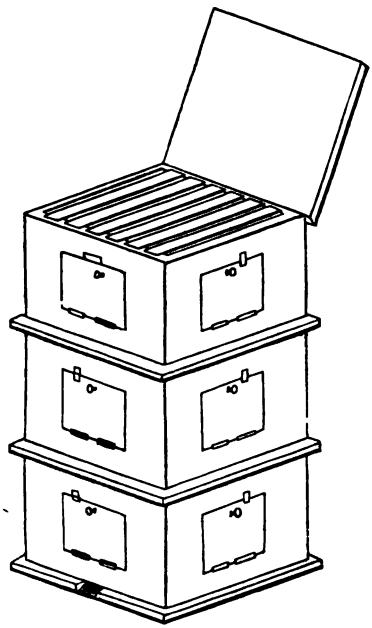
The Unicomb Observatory Hive.

or rather compels, the bees to build one uniform comb in each of the four parts of the *cross*. Upon the upper surface of this *cross*, there are five holes, in order that bell-shaped glasses may be placed over.

This hive affords, when in full operation, a pleasing and most interesting sight. It may be deprived of the surplus honey with great ease.

Hive the swarm in the following manner:—Place the swarm into the lower half, first taking care to stop the hole of communication with a bung. The bees should

be left quietly to pursue their labours in the lower half for some days, when the bung may be removed, and the cross placed over the opening. The bees will soon ascend, and quickly commence building combs. The taking of honey from this hive is similar to all others. By watching an opportunity, the cross may be removed, and the queen-bee left, with the remainder of the bees, in the bottom part. It should be considered, what its name implies, an *Observatory* Hive.



Storified Box-Hives.

Storified Box-Hives have been constructed upon plans recommended by Mr. Keys and Dr. Bevan. These box-hives are intended to be placed one upon another. A set consists of three boxes. Each box is made about eleven inches square, and seven inches deep on the inside, the thickness of the wood being one inch. There are three windows in each, the side over the entrance being left blank. Each box is provided with a moveable board; also, on the top of each box, are six moveable bars. The boards are to be placed, one between each box, which will prevent the bees from uniting the combs of one box to those of another. The upper or top board is so prepared that by moving it a little, glasses can be put on the top if desired. These hives have likewise a bottom, or alighting board. To take away a box when full, (it must always be the uppermost,) the same method is used as for a glass or small hive. But the boxes being much larger than glasses, a divider is used, and two would be more convenient. These dividers are plates of iron or zinc, stout enough to keep perfectly flat. Push them underneath the top box, and in this manner leave them for about an hour. At the expiration of this time, if the bees in the lower boxes are quiet, you may then safely take away your box; leaving one of the dividers, and taking one away with the box. After you have taken away the box, liberate the bees. They will gladly join their companions.

These boxes have been objected to as being more calculated for districts where there are extensive tracts of bee-pasturage, or where there are very favourable opportunities for the bees to collect honey. Undoubtedly the greater abundance of bee-food, the more the bees will thrive. Nevertheless, the boxes can, if required, be used singly, and be made available for a single stock. This may be done by merely placing an adapter-board so as effectually to close the communication.

I think these hives will be found to answer for most of the purposes for which bees are kept.

When you wish to place a swarm into one of these hives, take one* of the boxes, with a board fixed on the top to close all apertures. Place into it, in the usual manner, the bees, and set it where it is to remain. You can add the other boxes as circumstances may require, which do by lifting up the box, occupied by the bees, and placing the empty ones underneath; taking care to place an adapter between each box. This is termed nadir hiving.

The Collateral Bee-Boxes are square, and from ten to twelve inches high, and from nine to ten inches deep. They are arranged side by side; the communication for

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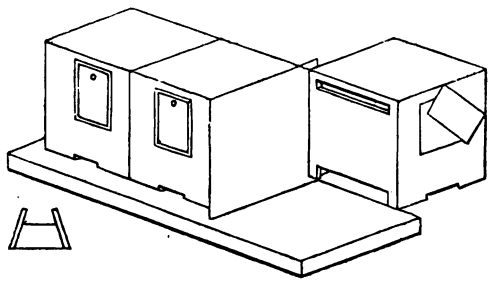
* Mr. Isaac recommends using two hives at once when you are putting the swarm in. He says it assists the bees in forming their combs straight with the bars.

the bees is made in the side where the boxes meet. When thus placed, there sometimes arises a little difficulty in getting the bees to enter the side boxes, in which case these should be rubbed with honey, or a



White's Collateral Hive, with a moveable Resting-Board.

piece of comb placed in them, in order to induce the bees to go in. Most of the modern boxes are made with a hole on the top for ventilation, or for placing on them glasses, or for feeding the bees; it can also be used to withdraw the humidity.—The article used for the last purpose by the Rev. W. Cotton is a tumbler glass inverted, first placing over the hole a piece of perforated zinc, or a piece of cloth or cotton. The system of arranging boxes side by side, when first introduced, did not claim reputation on the plea of preventing bees from swarming, but, on the contrary, that a moderate portion of honey might be taken, and increase, by swarms, promoted.

The inventor*, who first published this plan, was the Rev. Stephen White, rector of Holton, in Suffolk. In the introduction of his treatise, we find the following exclamation: "Bless me! I have often said to myself, why so much pains to hinder me from increasing my small stock? Why should they try to deprive me of a pleasure I so ardently look and long for every spring; and with which I am more delighted than all the other pleasures in the month of May?" This sentiment and feeling of Mr. White's, so exactly accords with my own that I will not add one word.—Madam Vicat, a Swiss lady, contrived some collateral boxes for bees, and a description of her hives was published by the Berne Society in 1764, which detailed some additional improvements. "In the floor board there is to be a hole, four inches square, and covered with a plate of *tin*, pierced with holes, in order to admit the air. The hive, or colony, may consist of four, three, or two boxes, as may be found most agreeable to the owner. It will also be convenient to have glass windows in the sides of the

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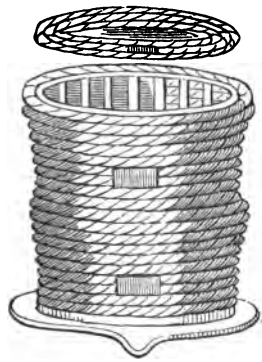
* I copied the figure of my hive from Mr. White's treatise, and I here wish to mention the injustice that has been done to his invention. If I am not mistaken, I trace this want of justice to Mr. Mills, who published a treatise on bees ten years after Mr. White, and in it he copied two boxes only from Mr. White's plate. This error has been repeated by other writers upon bees to the present time.

boxes, and a hole in the top, through which a thermometer can be introduced."

In the boxes now used for pursuing this system, there is but little material difference; but, in the quantity of honey that can be obtained, there is a great disproportion. Mr. White condemns the habit of raising too high the apiarian's expectations of reaping large products. He says, "My boxes are eight and a half inches square, and will hold one peck and a pint, or would contain, on an average, sixteen pounds when full." The modern boxes are twelve or thirteen inches wide, and nine in depth. The quantity of honey taken from a set of these boxes this season, says the author of *Humanity to Bees*, was 296 pounds.—The management of the bees in these boxes scarcely differs from that of other hives. The swarm should be received into the centre box; and, after a time, the bees should be allowed to pass into the side boxes.

The Moreton Hive, invented by J. Isaac, secretary to the Apiarian Society, is made of reed, stitched with the splits of willow or bramble. It is a cylinder, the diameter of which is twelve inches in the clear, and six inches in height. It is best when made upon a narrow hoop, with wimble-bit holes in it to receive the stitches of the first row, or coil, and a mortise hole in the forepart for an entrance, which is two and a half inches in horizontal length, and an inch and a quarter in perpendicular height.

This entrance is ordered to be nearly a quarter of an inch above the lower edge of the hoop; which I think very objectionable. The edge should be planed so that every part of it may touch the planed board. Two of



The Moreton Hive, with straw cover.

the middle coils at the back, opposite to the entrance, should be cut to receive a pane of glass nearly three inches long. The ends of the coils should be secured with mole-snap wire. A small stick is passed through the middle of the hive, which serves to support the combs. When you look through the pane of glass, to the entrance, the stick should be across the line of vision.

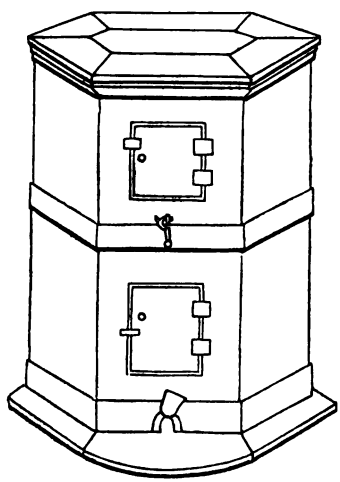
This hive should have a round deal board, fourteen inches in diameter, and half an inch thick, in which a set of bars must be cut, six in number, their width being an inch and three eighths, and the distance between each, half an inch. They should be fastened to the top

of the hive with deal pins, which ought to pass through the first into the second coil. There must then be a cover, a round flat top of straw, fourteen inches in diameter, which must be fastened to them, in this cover, and near the front of the hive, the observer can have a hole made, which may be covered by a piece of board, so as to turn at pleasure. In a good summer, the bees may be tempted to work in a bell-glass placed over the hole. There should also be provided two other hives, having bars likewise, but without tops.

In hiving a swarm Mr. Isaac recommends that two of these hives should be placed with their bars and windows perpendicularly over each other, and secured by a cord tied round them, to keep both firm until the swarm is hived and placed in the bee-house. When they have filled the first and second hive, raise them on to a third. "My reason," he says, "for shaking the swarm into double hives, even when one would be large enough, is the probability of their making the combs parallel with the bars. By stopping the entrance of the top hive, the bees are obliged to pass down between the bars of the second. The straits should have pieces of deal, made to fit into them, which can be taken out when you want the colony to have two or three entrances, and may be returned in August." In addition, I should place over these bars an adapter, such as is used by Dr. Bevan for his storifying boxes.

This would prevent the combs of the upper hive from being united to the bars of the other. The entrances can be made available by fitting in a wedge easily stopped at pleasure.

Mr. Isaac refers, also, to a Cottager's hive, similar to the Moreton, which last he terms the Gentleman's hive; also to colony hives, constructed by Mr. Golding, of Bridport, as well as to the preserver and remunerator by Mr. Roberts, of Crediton. He does not, however, upon the whole, consider them to possess advantages over the Moreton hives. He also mentions and describes a box hive, called the *Discoverer*, which is a show-box for amateurs, like the one by Mr. Keys, only better.



Hexagon Box Hive.

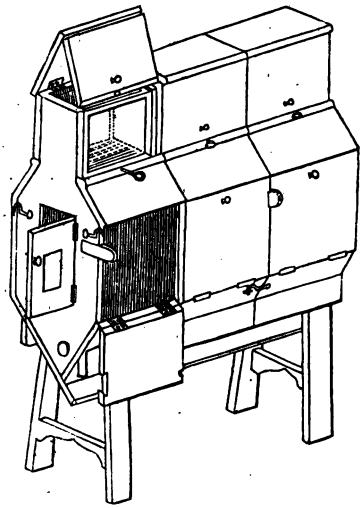
The hexagon and octagon hives, in their present state of improvement, cannot fail of being admired for their elegance and simplicity of structure. They present a novel and very ornamental appearance when placed singly or in a row, and possess great practical advantages; the maker having been engaged several years in perfecting their construction and bringing them to the present state of complete efficiency. They are made double, *i.e.*, with two stories; in each story there are two windows with shutters, by the means of which the movements and progress of the bees may be seen with the greatest facility. There is also an internal communication which may be cut off at pleasure, and this affords opportunities of taking honey in larger or smaller quantities, without injuring the bees. In their construction the greatest care and attention has been taken to render them capable of withstanding the action of the sun, wind, and rain. They are made of the best seasoned materials, and put together in the strongest manner, neatly painted and finished with brass-fittings. When placed amidst flowers and foliage they have a very light and tasteful effect. They are now made of two shapes, hexagonal and square, and are sometimes manufactured in mahogany. This material obviates the necessity of paint, but they should have a heavy coating of varnish. Ornamental stands or pedestals

may be had, corresponding in style, and these add much to their appearance.

As Mr. Thorley was a great advocate for these boxes I will repeat what he says on the subject. "An octagon, being the nearest figure to a sphere, is the best form, since the bees in winter lie in a round body in, or near, the centre of the hive. Thus a due heat is conveyed to all the out parts of the hive, and the honey is kept from candying. Now, in a square form, this could not be so effectually prevented; this is very prejudicial to the bees, and sometimes proves their ruin."

This remark I consider very important, and offer it for consideration to all who advocate collateral square boxes, and ventilation. Every lover of bees, if he has not already done so, should read THORLEY *on Bees*, for, by so doing, I am sure he will be equally delighted and instructed.

The management of bees in these hives is very easy. The swarm must be hived into the lower part. At any time the corks may be taken out, and glasses, or boxes, put over the holes. These hives, like all others, should have a temporary shelter, the better to protect them from the weather.



New Bee-Hive, introduced from America.

CHAPTER IV.

THE NEW AMERICAN HIVE.—THE HUISH HIVE.—THE GRECIAN HIVE.—LETTER BY SIR CHRISTOPHER WREN, ON THE TRANSPARENT BEE-HIVE.—BOX FEEDER.—FOUNTAIN BEE-FEEDER.—ROUND BEE-FEEDER.—FUMIGATING BOXES AND BELLOWS.

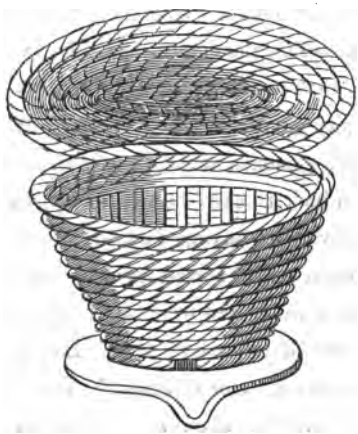
THE inventor called the original of my "New American Hive," *a transparent Bee-Palace.*—In this palace, I have effected very material alterations and, I think, improvements; namely, by dividing it into three

equal parts. It presents in appearance something like, if I may be allowed the term, the figure of a Collateral Hexagon. The three parts have each an opening, thereby allowing the bees to pass freely from one chamber to another. On the top are placed three glass boxes to be filled with honey, which are removeable at pleasure. There are glass windows in the sides, and at each end, which admit of the whole of the interior being inspected while the bees are at work. A novel, but very important, feature in this hive, is, its peculiar entrance. This occupies the whole length of the underneath part, and from the singular construction of the hive, it is very beneficial to the bees, as it materially assists them in keeping the hive clear of all extraneous matter, at the same time allowing them to enter any part they choose, without having to go first into one part before they can pass into another.

The shape and form of this entrance is new to us in our apiarian practice; and I anticipate there will arise much advantage from fresh contrivances and improvements. I think these will conduce to procure for our industrious tiny purveyors better, and more humane, treatment.

To place bees into this hive, the swarm should be hived into the centre part, taking care first to dress it with sugar and beer, or with honey. I recommend the adopting of the same method as is used for a Huber

hive, namely, first to put the swarm into a common straw hive and, late, during the same evening, shake it down upon a white cloth. Then place over it the American hive, or part of it, supporting this firmly while the bees are allowed to crawl up into it. There would be but little trouble in taking out a pane of glass on one side, for the purpose of putting in the swarm; but having so frequently myself hived the bees into one hive, and the same evening dislodged them into another, I think there will be no occasion for doing this.

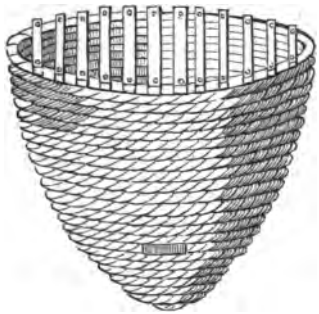


The Huish Hive.

The following description of *The Huish Hive* is taken from a treatise on Bees, by R. Huish, published in 1815, page 98.—"As it has always been my invariable study to save the lives of these valuable insects,

but at the same time to reap the utmost possible profit from their labours, the selection of a proper abode for them was to me a matter of no secondary consideration. My first object was to select materials that I judged would be most suitable, and for this purpose I was convinced there was none more so than straw. It was a flower-pot that first gave me the idea of the shape. This would, in the first place, supersede the necessity of sticks for the combs; for acting like a wedge, being larger at the top than the bottom, they could not fall down upon the board. One method only presented itself of extracting the combs, and this was at the top. To give to each comb its own foundation was not a matter of any great difficulty. Having obtained eight pieces of well-seasoned wood, about three inches broad, and half an inch thick, I laid them equidistant on the top of the hive, and having fastened them to the outer projecting band which served for their basis, I covered them with net-work, and over this I placed a circular board, the size of the whole hive. Lastly, I covered this, with a convex cover of straw." For further information respecting this hive, I refer the reader to Mr. Huish's treatise. It contains much useful and interesting information on the subject. I must here notice, that some writers have asserted that Mr. Huish was an advocate for killing, or at least was very indifferent about preserving the lives of the bees, so long as he

could possess himself of their honey. The above quotation decidedly refutes the assertion.



The Grecian Hive.

A few years ago about a hundred Grecian hives, well stocked with combs and honey, reached a mercantile firm in London, to whom they were consigned for sale. I purchased a few of them, and was much pleased with their make and simplicity. But I think that the Greek method of placing hives, and working the bees, is better adapted for a climate like theirs, which is not so variable as in England. From the appearance of the combs in the hives there was sufficient evidence that the bees had worked them parallel with the bars on the top. These bars had been removed previous to the hives leaving Athens, and care had been taken to keep them in an inverted position. The entrance for the bees is shallow and long, and about four inches from the bottom of this egg-shaped hive.

In the vicinity of Athens, as a recent writer informs us, the bee-men arrange their hives in rows upon the ground; but we are not to suppose they are left without a covering. (An error which has often been conveyed to us by writers who did not thoroughly investigate their method of management.) In addition to the clay and straw which they mix together and spread over the top of the bars, they generally place them in an open shed, or under a wall with a projection. This, although apparently a slight, covering, protects the hives from wet, and prevents them being overturned. We are also told, that they sometimes put large stones upon the top, to keep them steady. A precaution necessary, from this peculiar manner of arranging them.

The material of which these hives are composed is straw, bound and stitched together in coils, very much thicker than any that are made in England. Those in my possession weighed ten pounds each, the ones we now use weighing only four pounds. Those which come from Bedfordshire most nearly resemble these Grecian hives.

Thickness of straw is not material for the hives which are used only as covers for glasses; but it is requisite that *all* hives in which bees are to be kept, should be thick and well made, especially if intended to be

placed upon the ground*. It is evident the bee-men of Athens have experienced the benefit of having them made thick and strong.

To place a swarm in a Grecian hive, the hive must be reversed in its position, which appears, at first thought, to be no small difficulty; but this, like everything else, becomes easy by practice.

The following letter respecting the invention of a *transparent bee-hive*, was written by Sir Christopher Wren, when a Fellow of All Souls' College, Oxford.

" Honoured Sir,

"You have, by several hands, intimated your desires to me of having a particular description of our three-storied bee-hive. I confess I was not over forward to execute this command of yours, and my reason was because the device, not fully answering our own expectation, I thought it would be much more unsatisfactory to you; but since you please to persist in your desires

* Hasselquist says bees and honey abound in the land of promise, particularly near Nazareth. Here the bee-keepers make hives of clay, four feet long, and half a foot in diameter. They place ten or twelve, side by side, on the bare ground, and then build over them a small roof. Niebuhr, in his Travels, states, that the honey of Egypt is flavoured by the flowers of the orange and jessamine.

(as Mr. Rawlinson told me the other day), I can no longer be shameless to persist in my incivility, especially prompted by mine own ambition, to find any way to show myself a servant to a person so eminent amongst the *ingenious* as yourself.

"The description, I think, is evident enough in the paper. I shall only tell you what effects we find. Last May, as I remember, we put in two swarms together, leaving the places to go in open only in the lowermost; but all the passage holes open from box to box: in the middlemost they first began their combs, then in the lowermost, before they had filled the middlemost, and so continued till they had filled both, which before they had quite finished they began to make two little combs in the upper box, (all this while deserted) and continued besides a part of a comb of the middle story, an inch or two up into the upper box, filling almost the passage hole quite up, leaving themselves only a little hole as big as two fingers might go in for their passage up and down. I am not very certain whether this was not done at first when they wrought in the middle box; and whether this was not the reason why they wrought so little in the upper box, because they stopped themselves up from an easy passage to it. The combs in the lower story were well replenished with honey, and suddenly, but these little combs in the upper they quite deserted contrary to our expectation;

which was that they would have wrought most in the upper story, and in the middlemost, in which, when they had wrought enough for their own spending, that then we might take away the uppermost from them, and so have continued still: but if we find another year that they fill not again the uppermost it will be all one still to take away the lowermost from them; but if that be so, then two boxes will be sufficient. We must rather desire of you further light on this business, which I presume you can afford us from the observations of others who have tried the like experiment for us, yet you will see ours is imperfect.

"Sir,

"I am your most obedient, humble servant,

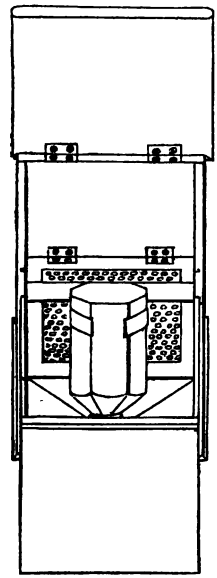
"CHRISTOPHER WREN."

All Souls' College,

Feb. 16, 1654.

The new box feeder is a very compact and efficient contrivance for feeding bees. It is adapted for all hives that have holes on the top. The engraving represents the interior of the box, with the lid open, and the front down. It contains a common physic bottle for holding the liquor, and, by means of the bottle being inverted into a round receiver, it conveys the liquor from thence into a zinc cistern. This has a perforated piece of the same metal through which the bees suck their food,

and together with the cistern is covered by a glass frame, made air-tight. The bees are thus effectually

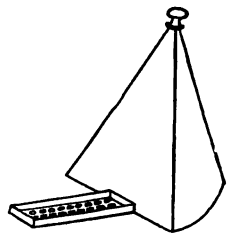


Box for feeding Bees, with bottle and shallow zinc cistern.

preserved from exposure to the weather, or the intrusion of other insects while feeding. An observer may, by looking through the glass, clearly perceive all their movements.

The glass fountain, used in bird cages for holding water, suggested to me the idea of having something like it for feeding bees. Hence my *Fountain Bee-*

Feeders. Ten years ago I had them made of glass; but found these were so easily broken, that I had recourse to tin, and have ever since used them made of this metal. When they are japanned they last many years. Each



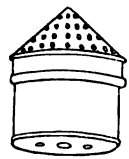
Fountain Bee-Feeder.

will contain nearly two pounds of liquor. The fountain is for feeding at the entrance, and care must be taken to put some little bits of straw into the trough leading to it, which will prevent the bees from getting drowned.

Round Bee Feeder.

The *Round Bee-Feeder* is a very simple contrivance. It is intended to hold sugar in one part, and liquid in the other; and, when placed on the top of the hive, the bees can take whichever they please, or both, and mix as they like. If you cut a hole in a piece of *cloth*, and put it over the hole, in the hive, and set the feeder upon this, placing also over it a bell-shaped glass,

you will then have made it nearly air-tight. Now, in some seasons of the year, this will be of great service to the bees.

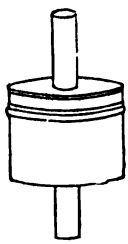


Fumigating Box.

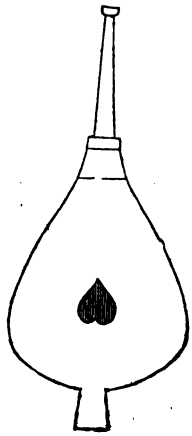
The Fumigating Box is used for stupifying bees with the narcotic recommended by Mr. Thorley. The manner of using it has been so fully described by those writers who advocate the plan, that it needs no further remark from me. Besides, never having used it myself, I cannot possibly say anything about its advantages, or effects. But I have no doubt it answers the purpose for which it was invented, namely, partial suffocation.

The following description of the smoke-box, or fumigator, and bellows, is taken from a work entitled "*My Bee Book.*" "Get a little tin box fitted to the nose of your bellows, having a sort of spout coming from it, which fits the door of your bee-hive. Take a piece of fungus, twice the size of a hen's egg, light, and when it burns freely, put it into the box; fit it on to your bellows, and blow the smoke into your hive. Stop that part of the door up with wet clay which the tin spout does not fill, that none of the smoke may get out.

The bees at first will make a great buzzing; in about five minutes all will be still as death."



Smoke-Box.



Bellows to fit Smoke-Box.

Still as death! painful thought is this, only a mild modification of the more cruel brimstone system by which so many of these little insects have met with untimely deaths.

THE PATENT BAR AND FRAME BEE-HIVE, invented by W. AUGUSTUS MUNN, Esq., Member of the Entomological Society of London.

The advantages of the "Patent Bar and Frame Hive" consist in affording perfect protection from wet in the open air, retaining an equal temperature within the hive, both in summer and winter; and in enabling the attendant to feed the bees without exposure to cold. It also provides a cool store-room for the honey; perfect inspection of the whole hive at any moment; an easy method of taking the honey without destroying the bees; protection from vermin; and also possesses the facility of being transported from place to place.

J. MILTON, of 10, Great Marylèbone Street, is authorized to supply the Patent Hives, which are all marked and stamped to ensure the confidence of purchasers. It is necessary, in order to prevent disappointment, that sufficient time be allowed for making them.

PART II.

SHORT EXTRACTS FROM WRITERS ON BEES.

I will give ye the sayings, and doings,
Of the old skilful fellows:
Ye can choose whether ye will try them or not.

BARNABE GOOGE.

On the Slovenly Management of Bees.

ALTHOUGH the present season is redolent of every variety of beauty in the organic world, there is, perhaps, no department which more invites observation than the economy of bees. The wonderful nature of their mechanism and structure,—the elegant and accurate mathematical construction of their cells,—their proverbial industry, and more than instinctive intelligence, together with the sweets which they collect, forming so large a portion of our domestic luxuries, have in all ages supplied themes for the poet and the moralist on which to expatiate, and deservedly render them objects worthy of admiration and attention from the intellectual mind. Hitherto it has been as disgraceful, as it has manifested

the extremely limited degree of attention that has been paid to it in common with other branches of rural economy, that their labours should annually be requited by their indiscriminate massacre, and whatever we know of their interesting and instructive economy subverted by a mode of management so utterly inconsistent with all views of rational practice.

It is rather surprising that in the works of Virgil, who has made bees the subject of his fourth and most interesting *Georgic*, should be contained almost as much information as in those of any writer since his time, each being equally deficient in accommodating the form and arrangements of their hive to the habits of the insect. It is probably solely on account of the defective principle adopted, that bee-management has been hitherto cultivated to such a small extent in this country, and that it should not have proved a more productive department of rural economy. Whilst so little of the correct principles of management is understood, as that the destruction of the bees has been considered absolutely essential, in order to the attainment of their stores, it is no wonder that so little attention should have been paid to their comforts and wants; that they should have been considered liable to contingencies over every other description of stock, and that the only management deemed essential should be to place them in a box (or straw) receptacle, however well or ill adapted for them, and

leaving them to chance alone to prosper or fail, until the time when their final doom, the reckless destruction of every bee, has arrived; and otherwise, when the proper principles of bee-management are understood and practised, (that of basing their domesticated state on our knowledge of their habitudes and instincts,) we shall probably find that no stock will be so certain, and that there will be no department of rural economy which practice may reduce to a more constant and certain success, because there is none so immediately under our observation and control.—ANON.

The best Poem on Bees.

About eighty years previous to HYLL'S *Treatise on Bees*, Ruccellai, an Italian of distinction, who aspired to a cardinal's hat, and who laboured with zeal and taste to render Italian poetry classical, or a pure imitation of the ancients, published his most celebrated poem on Bees. It receives a particular interest from the real fondness which Ruccellai seems to have entertained for these insects. All his descriptions are full of life and truth.—DE SISMONDI'S *View of the Literature of the South of Europe.*

Bees, Philosophers, and Poets.

Virgil seems nowhere so well pleased as when he is got amongst his bees; nor will it be wondered at, if we

consider the various and interesting objects which they offer to our view. While the philosopher examines the laws and government of the hive, the division of their labour, their almost human sagacity in providing for a season of dearth and necessity,—the poet is delighted to observe them in the bright and genial days of summer, roving from flower to flower, and to indulge his fancy in the many pleasing associations that are suggested by their habits and pursuits.—ADDISON.

Bees are Cheerful Objects.

A bee amongst the flowers in spring is one of the cheerfulest objects that can be looked upon. Its life appears to be all enjoyment, so busy and so pleased.—PALEY.

Lessons from Bees.

Let us never pass by a bee-hive with indifference. If we love to reflect on the works of our CREATOR, we shall find here a wonderful living object worthy our admiration.—STURM'S *Reflections.*

A Meditation.

Bees, industrious workmen; that sweep with busy wing the flowery garden; that search the blooming

heath, and sip the mellifluous dews; strangers to idleness! that ply with incessant assiduity your pleasing task; and suffer no opening blossom to pass unexplored, no sunny gleam to slip away unimproved. Most ingenious artificers: that cling to the fragrant buds, drain them of their treasured sweets; and extract even the odoriferous souls of herbs, and plants, and flowers. You, when you have completed your work, have collected, refined, and securely lodged the ambrosial stores; when you might reasonably expect the peaceful fruition of your acquisitions; you, alas! are barbarously destroyed, and leave your hoarded delicacies to others, leave them to be enjoyed by your very murderers.—HERVEY'S *Meditations.*

Aërial Labourers.

Here their delicious task the fervent bees,
In swarming millions tend: around, athwart,
Through the soft air, the busy nations fly,
Cling to the bud, and, with inserted tube,
Suck its pure essence, its ethereal soul;
And oft with bolder wing, they soaring dare
The purple heath, or where the wild thyme grows,
And yellow load them with the luscious spoil.

THOMSON'S *Seasons.*

The bee observe!
She, too, an artist is, and laughs at man,
Who calls on rules the sightly hexagon
With truth to form; a cunning architect,
That at the roof begins her golden work,
And builds without foundation.

By honest means like these, look here and learn
How good, how fair, how honourable 'tis
To live by industry. The busy tribes
Of bees so emulous are daily fed
With Heaven's peculiar manna.—HURDIS.

The careful insect 'midst his work I view,
How from the flowers exhaust the fragrant dew,
With golden treasures load his little thighs,
And steer his distant journey through the skies.
Some against hostile drones the hive defend;
Others with sweets the waxen cells distend;
Each in the toil his destined office bears,
And in the little bulk a mighty soul appears.—GAY.

The Pleasure, Profit, and small Cost of Bees.

For great profit and small cost; for their comely order and continual labours; the bees are the most worthy of our admiration; they bring products, both for food and medicine.—SIR JOHN MORE.

Mr. Mavor, in his account of Berkshire some years since, relates that a poor cottager cleared in one season twenty-seven pounds in money by his bees.—MOWBRAY.

Fabulous Division of Labour.

That some bees stay at home to receive the burdens and unload those that go to work, is a fable as Aristotle delivers.—PURCHAS.

Situation of the Apiary.

If possible set your bees on the south side of your house, where they will have more sun in winter, and they will best settle to their hives. Take care it is neither very cold in winter, nor very hot in summer.—SIR JOHN MORE.

It is commonly believed that an apiary is not well situated unless it stands in the sun. This is an error, bees like the shade while working, the sun only when they are in the fields.—GELIEU.

A seat of bees must be placed opposite to the sun at noon in the middle of winter, away from crowds of men and cattle; in a place neither warm nor cold. The lower valley is easier to fly to than higher ground. —COLUMELLA.

Place not your house directly east and west; but a point or two from the south-east to north-west; because the bees should not come forth in the morning before the sun is risen about an hour, and they continue above an hour after the sun has set.—GEDDE.

Your bees must be near your house, that you may have them in sight. Place them on the south side, and the fence on the north, high, let the fence on the east also be high; to keep the bees from wind and sun, as the sun entices them out when the wind is so cold that they cannot endure it; but in no-wise shelter them from the south sun, for this dries and relieves the bees in winter and spring, and causeth them to swarm in summer.—SIR JOHN MORE.

Ancient description of Working Bees.

The working bees have very large heads and eyes, covered with a horny membrane. The horns grow above their eyes the length of a corn of wheat; in their mouths are teeth; their tongue is larger than their mouth and lies doubled underneath and reaches to the breast; they have four wings, and six legs; they stand upon four, and wipe their eyes with two.—SYDSERFF.

The king is of a darker colour, thinner and longer than the queen. The queen is easily known from the

king, being of a larger size and not so dark; she has red rings round her body. The drone is thick, clumsy, and a great deal larger than the common bee.—W. Groves.

With ease distinguished is the royal race,
One monarch wears an open honest face;
Shaped to his size, and god-like to behold,
His royal body shines with specks of gold,
And ruddy scales: for empire he designed,
Is better born, and of a nobler kind.

From Natural and Sublime Thoughts.

An Opinion still Disputed.

A difference of opinion exists: some say there is no king in the hive, but only a queen. I have now embalmed in small phials, kings, queens, drones, and workers, old and young.—W. Groves.

Royal Punctuality.

If you see her come forth one day, you may be sure to see her come also the next day, at the same hour, and same minute. The guards attendant on her majesty are known by the crest, tuft or tassel on their heads, they are of different colours and sizes, according to their several dignities.—Sydserff.

A Domestic Pattern.

Queens in their natural state leave the hive only once to seek the drones, all the rest of their lives they remain voluntary prisoners.—HUBER.

Queens can Fly before Workers or Drones.

Queens are in a condition to fly, (when the bees give them liberty) and to take the first moment of sunshine to depart at the head of a colony: neither drones nor workers are in a state to fly for a day or two after leaving their cells; at least twenty-four or thirty hours must elapse.—HUBER.

Succession of Queens.

It is therefore probable that a hive from twenty to twenty-five years old has not always the same queen, but that the queen has from time to time been replaced every time a swarm comes, if it is the old queen that leaves the hive.—GELIEU.

Insect Loyalty.

The working bees serve their queen in everything; they clean her, they cluster about to keep her warm, when their food is almost spent they will starve and die to keep her alive.—SYDSERFF.

How Long do Queens Live?

I do not believe that the queen lives ten, fifteen, or twenty times longer than the working bees; but that the bees have their means of filling her place when she dies.—GELIEU.

Distribution of the Eggs.

When the queen has laid a cluster of eggs to the number of thirty or forty, more or less according to circumstances, on one side of the comb, instead of laying in all the empty cells in the same quarter, she removes to the other side and lays in cells which are directly opposite to those that she has just supplied with eggs, and, generally speaking, in none else.—SIR W. JARDINE.

Difficulty of observing Bees at Work.

It would be a most desirable thing to see the bees at work, but it is scarcely possible to see anything of the kind distinctly, even with glass hives, for no bee ever works singly on this occasion; there are numbers together, all trying to assist one another, their motions are so swift, and so hidden by their standing before one another that very little can be seen.—REES' *Cyclopædia.*

Bee-Surveyors.

It is invariably a single bee that selects and determines the site of the first cavity, which being established serves to direct all their future labours. The bees cannot deviate from the rule prescribed, unless particular circumstances alter the basis of their work; this is done by the wax-workers, which are not endowed with the faculty of sculpturing the cell.—HUBER.

Bees can enlarge the Honey-Cells.

There is another circumstance under which bees enlarge the dimensions of their cells; namely, when there is an opportunity for a good collection of honey,—at this time the diameter, also the whole space of the comb, is elongated an inch, or even an inch and a half in depth. —HUBER.

A doubtful Observation.

Whenever the queen goes forth to take the air, as she often does, the small bees attend, guarding her before and behind. These make a different noise; by their sound I know when her majesty is coming forth, and I go and call persons to come and see her.—SYDSERFF.

Curious if True.

Mouffett supposes bees may live thirty years; that he knew a stock in the ceiling of the house of the Duchess of Somerset, more than three decads of years, and that it swarmed four times almost every year.—PURCHAS.

The Americans differ with Huber.

Sometimes there are five or six kings and queens in a hive; give them plenty of room. In Grove's Bee-Palace, they will live together agreeably; they divide their combs as the United States of America are divided. —W. GROVE.

Whether Drones are essential to the Breeding of Bees.

Though no drones are ever found in hives during winter, it is evident that the working bee can be bred without their presence. With respect to the bee depositing the eggs in the cells in the Autumn to be hatched in the Spring, I think it a very fallacious notion; though laid great stress upon by one of the latest writers on the breeding of bees.—HODGSON.

The drone is a gross stingless bee, that spendeth his time in idleness, yet he is of such necessary use that, without him, the bee cannot be.—SIR JOHN MORE.

"*The Drowsie Drone.*"

The drones are driven out of the hive and banished by the other bees. "From hence they drive the drowsie drone." The drone is an imperfect bee, but very like the workers, only that he is much larger bodied, lying always idle in the hive, not labouring himself, but lubber-like feeding on the provender of his fellows.—BARNABE GOOGE.

The Drone a short-lived Gentleman.

The drones are but short-lived insects, did they live their utmost date. It is true poor stocks, such as have but few bees, but yet plenty of combs and honey, let the drones live; yet not one will outlive October.—PURCHAS.

Death of the Drones.

All the drones are so generally expelled, that of several hundred, which we have often remarked in one hive, by the end of October we have not found a single drone in the several hives we have examined.—MIRALDI.

In the months of July and August it is usual for the bees to free themselves of the males. We constructed a glass table on which we placed six hives, all being swarms of the same year. On the 4th of July, lying down, we saw the workers actually massacre the males in the whole six hives.—HUBER.

The Drones take long Naps.

Drones do not enter the cells while reposing, but cluster together on the combs, and sometimes remain in this position eighteen or twenty-four hours without the slightest motion.—HUBER.

A Peep into the Hive in Winter.

On the 12th of February, 1814, in the neighbourhood of London, by accident one of my hives was thrown down with violence, and the combs knocked out of the hive; it was a sharp frosty day; snow was upon the ground. On examining the combs, there was upwards of one hundred young brood of the common bee, in two pieces of the comb near the centre of the hive, in a state that they would have come out of the combs perfect bees in five or six days. There had been one of the severest frosts for two months before that was almost ever known in this country, and I think the bees could

not have ever gone out of the hive, during the time these young brood were being brought forward.—HODGSON.

The use of Heat in Hatching the Brood.

As they cluster closely in those parts of the comb which are filled with brood, in order to concentrate the heat necessary for their being hatched, the heat will of course penetrate to the other side, and some portion of it would be wasted, if the cells on that side were either empty or filled only with honey. But when both sides are filled with brood and covered with hive-bees, the heat is confined to the spot where it is required, and is turned to full account in bringing the young to maturity.—SIR W. JARDINE.

Preservation of the Honey.

Their instinct leads them during the end of summer to close up every crack and crevice, with a sort of gummy matter, which cannot be penetrated by moths, ants, or even mice.—GELIEU.

A Conclusion, sometimes Forgotten.

After all there are mysteries as to the *primum mobile*, amongst these social tribes, that, with all our boasted reason, we cannot fathom.—BAGSTER.

An Old English Proverb.

A swarm in May,
Is worth a load of hay.
A swarm in June,
Is worth a silver spoon.
A swarm in July,
Is not worth a fly.

The Swarming.

As from the rocky cleft the shepherd sees,
Clustering in heaps on heaps the driving bees;
Rolling and black'ning, swarms succeeding swarms,
With deeper murmurs and more hoarse alarms;
Dusky they spread a close embodied crowd,
And o'er the vale descends the living cloud.—HOMER.

How to obtain early Swarms.

If early swarming be desired, early breeding must be promoted by feeding with sugared or honied ale in February and March; also by keeping the stock warm. —*The Honey Bee.*

Feeding Bees in Olden Times.

In rainy weather, continuing long, bees not being able to go out of their hives to seek pastures, and to

bring home food unto their young brood, you must not fail to help them with some provision (honey, or honey and wine,) until such time as they are able to fly abroad to get their own living and work their combs; for otherwise you shall quickly make an end of them.—STEVENS' *Countrie Farme.*

What do Bees live upon?

I cannot believe that pollen furnishes food for the bees, but I think they only swallow it in order, by mixing it with honey and water, to prepare the liquid food for the grubs. Besides bees often starve in April, when their stock of honey is consumed, and when they can obtain in the fields abundance of pollen, but no honey. When pressed by hunger they tear the *nymphæ* out of the cells, in order to support life. But if in this condition they are not artificially fed, or if the fields do not soon yield their proper food, they die in the course of a few days.—F. W. GUNDLACH'S *Natural History of Bees.*

Artificial Food for Bees.

The proper food for bees is a pint of ale, a pound of sugar, and about half an ounce of salt. The whole to be just boiled and stirred. When cold it will have the consistency of honey, and is then fit food for the bees. —*Cottager's Manual.*

Cookery of Bee Food.

I must here notice, that sugar simply dissolved in water (which is a common practice), and sugar boiled with water into a syrup, form compounds very differently suited for the winter store of bees. When the former is wanted for their immediate nourishment, as in the Spring, it will answer equally as well as syrup: but if it be laid up by the bees as store, the heat of the hive, quickly evaporating the water, leaves the sugar in dry crystals, which cannot be acted upon by the trunks of the bees.—Dr. James Howison.

Bad effects of lifting Hives up.

I will engage if a hive is lifted up for several days together, that if the bees do not leave it, they will not be worth a shilling to the owner; the lifting up breaks the ladders. The bees also fix the hive round the bottom down to the board, with a kind of glue, not obtainable at all times of the year.—Sydserff.

Huber's Proof that Bees cluster like a Globe.

Supposing hollow trees to be their natural situation, in imitation of such places we lodged a swarm in a glass hive, five feet high, which on all sides exposed their pyramidal cluster suspended from the combs.—Huber.

Good Advice and True.

Many persons are fond of bees: but it is not enough to be fond of them; they must be skilfully taken care of, more particularly in bad years. Mistaken care annoys them; niggardliness ruins them.—Gelieu.

Swarming.

On the whole the facts relative to the formation of swarms perhaps present more subjects of admiration than any other part of the history of bees: the simplicity with which Nature guides their instincts, the impulse of pleasure leads them on, but not that alone.—Huber.

Worthlessness of Hives which do not Swarm.

All stocks of bees, three years old and upwards, that have missed swarming for two years together, are not worth much, especially those that have laid out the summer before, and not swarmed. These seldom if ever prosper.—Sir John More.

Old Queens lead the first Swarm.

In the course of spring and summer the same hive may throw off several swarms: the old queen is always at the head of the first colony; the others are conducted by young queens.—Huber.

When the Bees will not Swarm.

If the bees work a comb under the board of their stand, it is a sure sign that the hive will not swarm that season.—DANIEL WILDMAN.

Elevation of Apiary.

In a memoir addressed to the Society of Agriculture at Paris in 1811, an apiarian, speaking of a swarm that had been lodged in an elevated part of his house for eighteen years, says, "This hive has uniformly sent forth a number of swarms, which have always escaped, because the height of the place facilitates their flight to a greater distance."—HUISH.

Difficulty of preventing Swarming.

In ascribing swarming to want of coolness and want of room, how do we know what the bees are doing inside? The bees in the side hive were the first swarm. When the cast was hatched, the two hives were too crowded. The queen with the bees in the old hive swarmed.—REV. W. COTTON.

Signs of first Swarms.

I know of no certain signs of the first swarms coming forth; but, in the swarming hours, if you see bees

running hastily up and down the outside of the hive, or gather themselves in a bunch on the stand, you may be sure of their swarming in a short period.—SYDSERFF.

A useful Observation on Swarms.

Should the weather, for some days after swarming, be unfavourable for the bees going out, they must be fed with care until it clears up; otherwise the young swarm will run a great risk of dying.—DR. JAMES HOWISON.

The Benefit of dressing Hives.

The first of July my bees swarmed, a piping-hot day. They clustered round the stem of an espalier tree; a gentle method was used. A well-dressed hive was held over the swarm, and lowered gradually; it took about half an hour: it was a splendid swarm.—REV. W. COTTON.

Signs of Swarming.

When bees remain outside their hives all night, it is a sure sign they are near swarming.—*Cottager's Manual.*

Imperfect Swarming.

At Coleford, I was asked advice about a stock of bees that had swarmed every day and gone back again to

their hive. I inquired the time that they came forth that day, that I might see them myself. I went the next day at the exact time, and I observed that the queen had but one wing.(?)—SYDSERFF.

Swarming indispensable, as acknowledged by a Practiser of Ventilation.

I am no enemy to bees swarming; on the contrary, I think there is no pleasanter sight in a garden than to see a swarm of bees; no pleasanter sounds than those which wait upon your bees when they swarm. Keep some good stocks for the sole purpose of swarming, they will keep up your hives to their full number.—REV. W. COTTON.

A Note from Palladius upon the Signs of Bee Swarming.

Let the wary and diligent bee-keeper look to all his hives in the spring months, about the eighth hour of the day, when he may mark the flying out and coming in of the young bees. Now, the readiness of bees to swarm may be known two ways: First, when for some days before, at the setting of the sun, they plentifully gather in a heap before the mouth of the hive, like to a cluster of grapes. The second is, that when they are minded to swarm within three days, they make a great

noise and a stirring to and fro, inside of the hive in the evening, like soldiers do at an alarm within a castle.—HYLL.

A doubtful Rule.

Remember that first swarms invariably begin the construction of their combs in the middle of the hive, while second and third swarms begin at one of the sides. —HUISH.

A Rule reversed.

In order to make bees swarm, keep them as cool as possible by watering and shadowing them; then by enlarging the entrance to give them more air. If they still lie forth and will not swarm, the next day sweep them off; and by their rising into the air, perhaps the others may come forth and join them.—*Dictionary of Husbandry.*

Want of Room, not the Cause of Bees Swarming.

Bees lodge in chimneys, in the hollow trunks of trees, and I have known some which lodged under the tiles of a garret, for a series of years. They work in these places, throw off their swarms, notwithstanding the disproportion of the dwelling that they occupy.—HUISH.

Hints to Swarm-Preventers.

I only hint these things to such that hath been at so vast an expense to prevent the swarming of bees, having done so myself for several years without profit, and having shared in many disappointments. I now wish to try some experiments to multiply swarms instead of preventing them.—WORLIDGE.

Even now, although ventilation has been proved to dispense with the necessity of swarming, in hives already stocked; yet ventilating hives are dependent on a swarm to make a beginning.—BAGSTER.

Are there Varieties of Bees?

To the common observer, all working bees, as to external appearance, are nearly the same; but to those who examine them with attention, their difference in size is very distinguishable; and they are in their vicious, gentle, indolent, and active natures, essentially different. Of the stock which I had in 1810, it required 250 to weigh an ounce; but they were so vicious and lazy, that I exchanged it for a smaller variety which possesses better dispositions, and of which it requires 296, on an average, to weigh an ounce.—DR. JAMES HOWISON.

How to improve Bees.

The breed of bees may be improved, as well as the breed of cattle. Get an early cast of bees "from some bee-keeper" that was swarmed on the same day as one of your own, from as good a working sort as you can get; bring them home; in the evening unite them together. The next morning place them on your stand. This I would recommend if your bees are small and weakly, or become idle. But when your bees are going on well, rather than try experiments, I would leave well alone.—*The Cottager's Bee-Book.*

The exact Weight and Number of two Casts of Bees.

On Friday, September 19, 1766, I took a particular account of the number, weight, and measure of two casts of bees. The first weighed one pound one ounce; and contained

206 in each ounce.
16

3296 in a pound.
206

3502 Total number.

They measured one quart, and rather more.

The next cast contained

256 in an ounce.
16

4096 in a pound.—Total number, 4181.

They weighed one pound and three-quarters of an ounce, and measured rather more than one quart.—*From a Manuscript on Bees.* J. M.

How to calculate the Weight of a Swarm.

A swarm, on Saturday, June 9th, weighed four pounds. It has been calculated that 4480 bees go to a pound; ergo,

4480
4

17,920 of bees in my swarm.

REV. W. COTTON.

Comparative Weight and Number of Bees.

I took some bees out of a hive on the 9th of March 1768, being a very cold day. I let them fly to a window, which soon chilled them, and they fell as dead. Of these I collected as many as weighed half an ounce; the number of them was 154, which gives to the pound 4928. I weighed another half-ounce, and found the number to be the same.—WILDMAN.

I put into a scale a half-ounce weight; into the other, some bees. It took 168 to make the equilibrium. These bees had been killed in a battle by a band of aliens. In a pound there were 5376 bees.—*Natural History of Bees.*

The exact Number of Bees in a Swarm.

From a very strong colony, I had a swarm, which I counted. It contained 17,128 workers, 60 drones, and one queen.—STRUTT.

Each Bee in a Hive examined Separately.

My assistant offered to examine each bee in a hive separately. It was necessary, in order to do this, to seize the whole of the bees in the hive, notwithstanding their irascible nature. Eleven days were employed in doing this; he took every bee in his hand, examined the trunk, the hind limbs, and the sting.—HUBER.

The Golden Rule;—never kill a Bee.

The poor bee has enough enemies to contend with: starvation and damp in winter; moths, hornets, wasps, and robbers of their own kind in autumn; dry summers, which often press them very hard; cold and backward springs. It has been well said, that man, who ought to be their best friend, is often their worst enemy.—REV. W. COTTON.

O man! tyrannic lord! how long, how long,
Shall prostrate nature groan beneath your rage,
Awaiting renovation? When obliged,

Must you destroy? Of their ambrosial food
Can you not borrow, and in just return,
Afford them shelter from the wintry winds?

THOMSON.

Fumigation, an old System.

If the swarm be hid in a cave, you may fetch them out with smoke. Hyginus, in the book he wrote about bees, says, Aristomachus was of opinion that vitiated honey-combs should be taken away, and then those left in the hives should be fumigated.—COLUMELLA.

The Fungus of many Names.

The narcotic for stupefying is only the fume of the *fungus maximus*, *fungus pulverulentus*, or larger mushroom. It is also known as bunt, puckfist, or frog-cheese; it is larger than a man's head. It is to be baked in the oven after the bread is drawn.—THORLEY.

The Intoxicating Fungus.

The fungus does no harm to bees; it only makes them drunk; which is very good for bees(?), though bad for men. Bees get well in twenty minutes; they have no headache next morning, and are all the merrier after it.—REV. W. COTTON.

I am persuaded the terror impressed upon the bees by driving, continues longer than the effect of Mr. Key's fumigation, and therefore you have more time to do every thing well. Besides, his puffs (of many names) will not burn properly; they are sometimes so weak as not to stupefy, and at other times so strong as to kill thousands of bees in half the time he allows for fumigation, as I have found by experience.—ISAAC.

Driving Bees by Wholesale.

In the year 1787, I drove seven stocks of bees, all in one day; the next morning four more. The next year, 1788, I drove sixteen in one week: fifteen of which died. In 1789, I did not drive any, for I did not like it.—SYDSERFF.

Fumigating, a violent Proceeding.

When bees are left to construct several rows of combs, we are prevented from knowing what passes, they must be smoked for the purpose of examining their structure: this is a violent proceeding, which has a material influence on their instinct.—HUBER.

Driving Bees not Profitable.

I omit the manner of driving bees. The invention is only of curiosity, and nothing of profit. Whilst some

have thus endeavoured to enrich themselves by getting the honey and losing the bees, they have made good the old proverb, "All covet, all lose."—Sir John Morr.

Quietness essential to Bees.

Bees should by no means be disturbed in cold weather, so as to provoke them to come out of their hives, not only in winter but even in spring, summer, and autumn; for if they fly out of their hives on a cold wet day, their active powers are soon numbed; they are unable to fly, therefore they crawl about until they perish.—Bonner.

Removing of Hives an injurious Practice.

A hive should remain affixed to the spot, as the ancient oaks in the hollows of which the bees delight to establish themselves, where they have their young, their companions, their beloved queen, and all their treasures.—Gelieu.

Effect of lifting up Hives from the Boards.

I moved a middle, (of three boxes,) into which a swarm had been put about a week, when most of the combs broke short off at the top; and fell down in a mass on the board, covered with bees. It was mere curiosity which induced me to lift up the box.—Rev. W. Cotton.

The fatal Effects of trying unnecessary Experiments.

Her dread majesty (the queen) I placed on the back of my hand, and held her by the pear tree. The bees left the tree for my hand; they hung in a cluster like a bunch of grapes. I carried all the bees round the garden; but a great many returned to the hive. I placed the queen on the alighting board; she went into the hive; the whole swarm followed at her heels. In about ten days, they went to the same tree, and in a cluster on the ground the queen was found, dead, stiff, and dry.—Rev. W. Cotton.

Shutting up Bees very bad.

In winter, by shutting them up for fear of snow, more perish in their unwholesome prison; the humidity, having no outlet, moulds, and sometimes rots them. Who shuts up bees in the forests, where they thrive so well? There they have no master to thwart them.—Gelieu.

Effects of removing Hives to a northern Aspect.

Every thing seemed to promise a fair start. I removed the hives to a shed which had a northern aspect; it was tolerably dry. I omitted to raise them to let the damp run out. I confined them with perforated tin,

which is a bad plan. To make a sad tale short, only two stocks got through, and the combs of these were in a bad state.—Rev. W. Cotton.

Against removing Bees to Winter Quarters.

I left one half out, and moved the other into a cold room. I bestowed great pains upon them, but could scarcely keep them alive, or preserve them from damp and infection. At the end of March they were far less prosperous than those that were left out of doors.—Gelieu.

Honey-Dews.

The true honey-dew is an exudation from the leaves of a few species of trees and plants, the oak, maple, sycamore, lime; seldom on cherry, gooseberry, or currant bushes. Its time of appearance is about ten in the morning, and its duration about four or five hours, according as the sultry heat which produces it continues. This substance is as transparent and as sweet as honey; in fact it is honey. In some years there is none at all. When a honey-dew is produced, the activity of the bees is unremitting. More honey will be collected in one week from dews, than in many weeks from flowers.—Keys.

Honey from Honey-Dews.

After the honey-dews are over, bees gather but little; neither do they build combs, having no need of them; but fill all their cells to the very top with honey, and the spaces betwixt with their bodies.—WORLIDGE.

Bees will not leave their Honey.

The bees will never forsake their combs that are full of honey, as I have several times proved, by inverting a hive bottom upwards, and placing another over it; the bees built some combs, yet by far the greater part of them kept to the old hive.—WORLIDGE.

Economy of Honey by the Bees.

Not a single ounce of honey has ever been wasted since the world was made. Never press your combs, for the honey which you squeeze is nearly useless to sell. Put the combs and refuse carefully by until your bees want food.—REV. W. COTTON.

A rich Harvest.

In the year 1798, I purchased a glass of honey that was filled in one month, by some bees belonging to a gentleman residing fifty miles from London. It con-

tained sixty-three pounds weight of fine honey. The hive had more honey left in it than would be required for the support of the bees during winter.—DANIEL WILDMAN.

Variation of the Seasons.

In ten years of honey gathering, it is found that four are very bad years, four middling years, and two very good.—REV. W. COTTON.

Which Honey has the best Flavour?

That flowers impart a portion of their flavour to honey seems to be generally admitted. The balm of Pontus, the thyme of Hymettus, and the rosemary of Narbonne, are supposed to give excellence to the honey obtained from these places.—*The Honey Bee.*

His bees are sure to do well who has clover fields, and lime trees near, though he has never a rood of garden ground; borage is the best garden plant, mignonette also is a plant of which you cannot sow too much. He is surely a hard man to please who is not well pleased by the scent it yields, as well as by its look, in his garden. The bees work at it early and late; no one who has tasted mignonette honey would wish to taste better.—REV. W. COTTON.

The bee
Sits on the bloom extracting liquid sweet,
Deliciously, and builds her waxen cells
With honey stored.—MILTON.

Capping, or using Small Hives or Glasses.

I have taken honey from bees in this manner with much success for more than thirty years, nor have I seen any way pointed out by the various writers on the subject, in which it can be obtained with so little risk and inconvenience to the bees.—HODGSON.

Consumption of Honey saved.

Dr. Playfair, in his Lecture, delivered before the Royal Agricultural Society, observed, "Warmth is thus seen to be an equivalent for food. This is illustrated by the fact that two hives of bees do not consume so much honey when together, as when separate, on account of the warmth being greater, and they have less occasion for consuming the honey which is their fuel."—*Illustrated Polytechnic Review.*

Pure Honey obtained without Fumigation or Ventilation.

I have sometimes had a small hive or a glass (holding from ten to twelve pounds) filled by the bees, which I have taken off in eighteen days, and in no way can it be taken in a purer state. The honey will be more valuable for sale and ready to take to market six weeks or two months earlier; and this without using any violent means to obtain it.—HODGSON.

A good Honey Year.

A person in the neighbourhood of Bury has taken from a swarm of this year (1831) nineteen pounds of honey; another thirteen pounds and a half; another twenty-one pounds and a half; another twelve pounds; leaving in each hive thirty-five, and in some forty pounds, which will sell at two shillings per pound.—*Suffolk and Norfolk Apiarian Society.*

Source of the Best Honey.

The middle of the county of Essex, in the vicinity of Bocking, and Braintree, produces probably some of the best English honey.—MOWBRAY.

How much Honey, &c., can a Hive of Bees collect?

A swarm consisting of twenty thousand bees hived amongst old combs on the 8th of June, 1798, increased in weight in ten days, twenty-one pounds.—HUBER.

Bees in Foreign Parts.

Bees are an object of much attention in Hungary, Galicia, and Transylvania, where many persons derive an income from their productions. They possess apiaries containing from 150 to 200 hives. In many parts these insects are left to their own instinct; no other care is bestowed upon them besides enlarging the hole in the tree where they are lodged, and providing them with a shelf. In Dalmatia, where the small district of Cattaro annually exports above 15,000 pounds weight of wax and honey, the hives are constructed of rough marble, with a moveable lid. The finest Austrian honey is the white kind, made in Hungary and Galicia. The whole quantity produced is estimated at 350,000 cwts., to which 20,000 cwts. of wax may be added.—*Daily Newspaper*. 1831.

Size of the Hive.

The size of the hive ought to have a certain proportion to the swarm. Bees thrive not in an apartment

too large and roomy. Bees like not too roomy an apartment, as is found by the weak swarms: and if such an habitation be not changed for a smaller one, more proportionate to their numbers, they languish and all ultimately perish.—Rev. W. Cotton.

Profit of Bees in Spain.

Mirula reports that Varro had yearly for the rent of his bees a thousand gallons of honey, and that a house in Spain, not having an acre of ground to it, made, yearly, fourscore pounds worth of honey and wax. Thus this poor little creature, the bee, doth not only procure us delicate honey, but by great labour, diligence, and travail, proves of great benefit to man.—Barnabe Googe.

The Don Cossacks.

These people keep large stocks of bees; the number of apiaries a few years ago was 1044, which contained 30,201 hives, and produced annually 8299 poods, about 298,764 pounds weight of honey and wax.

Bee-Culture in Sicily.

Sicilian honey is in much estimation, and owing to the great consumption of wax in churches, the proceeds of bee-hives form a valuable item in husbandry.—Simond's *Travels in Italy and Sicily.*

Bees without Hives.

Bees' wax is a commodity of great importance in all the eastern islands, from whence it is imported in large oblong cakes to China, Bengal, and other parts of the continent; no pains are taken with the bees, which are left to settle where they list, (generally on the boughs of trees) and are never collected in hives. Their honey is much inferior to that of Europe as might be expected from the nature of the vegetation.—MARSDEN'S *Sumatra.*

Bees in New South Wales.

Our bees are in shape like the European; but they a e little larger than the common house-fly, and have no sting. They live in hollow trees, produce very fine honey and wax, which is much sought after by the natives. We have also solitary bees, and solitary wasps. Some European bees were introduced here a few years ago, but falling into careless hands, little attention was paid to them. Lately, however, some swarms have been obtained by a careful individual, and we hope soon to see the colony stocked with them. A number of swarms have, at different times, escaped into the woods, and the climate being exceedingly favourable for bees, we may expect soon to

see honey and wax added to our list of exports. It is feared by some that the bees, through being able to collect honey all the year round, may cease to swarm and become solitary. In this apprehension I do not participate, for no animals or insects naturally gregarious, ever, I believe, become otherwise.

P. CUNNINGHAM'S *Two Years in New South Wales.*

Stingless Bees.

A swarm of these curious little insects arrived in this country, (they came, I think, from Sydney,) and were presented to the Horticultural Society, and deposited by them in their gardens at Chiswick. I went to see this curiosity, for to me it was such. The hive containing them was placed in a pit, covered by a frame, similar to those used for growing melons, and very unsuitable for the inhabitants. I looked into the hive by withdrawing a slide that covered a piece of fine-wove wire-work. Upon the admission of the light, these little aliens exhibited all that irritability evinced by the European bees. They flew around us, and made a soft and plaintive buzz of distress and uneasiness; upon which I begged that they might not be further disturbed; but it was to no purpose, for these, like the European bees abovementioned, fell into careless hands, and thus their

existence was but of short duration in England.—J. MILTON.

Importation of Honey and Wax into England.

It must be allowed that a very considerable sum of money is annually expended in the import of foreign honey, to the extent, it was averred a few years since, of 240,000*l.*—MOWBRAY.

I have taken the trouble to see how much bee-produce is brought into England every year from foreign parts. It is 32,000*l.* in wax alone, besides honey. Every sixpence of this might go amongst those to whom it is of the greatest consequence, namely, to our own cottagers.—REV. W. COTTON.

Honey in China.

There is great abundance of honey in China, for they wonderfully delight in keeping bees. There is likewise much wax; you may have ships, nay fleets, laden with honey and wax.—MINDOSA'S *Treatise on China.*

The King-Bird, a great destroyer of Bees.

The King-Bird is a great destroyer of bees. Mr. St. John took from the craw of one he shot, one

hundred and seventy; on laying them *all* on a blanket in the sun, fifty-four of them returned to life, licked themselves clean, and joyfully went back to their hives.—*The Honey-Bee.*

The Food of the Bee.

A drop of syrup is lodged deep in the bottom of the *corollæ*, in the recesses of the petals, or down the neck of a monopetalous glove. Into these cells the bee thrusts its long narrow pump, through the cavity of which it sucks up this precious fluid, inaccessible to every other approach. The plant is not the worse for what the bee does to it; the harmless plunderer rifles the sweets, but leaves the flower uninjured.—PALEY.

Advantages of Feeding Bees.

The supplying bees with food in any season, but more especially in spring, is good; it cheers their spirits and causes them to breed earlier. I would recommend every bee-master to give a little food even to those hives which have an abundance, in order to encourage the bees to hatch their young early in the season.—BONNER.

Do Bees drink Salt-water?

In the Isle of Wight the people have a notion that every bee goes down to the sea-side to drink, once a-day; but that after June they leave off drinking.—Rev. W. Cotton.

A Bee has a Tongue, but not a Sucker.

The great instrument by which bees collect their food, is their tongue; with it they can wipe both convex and concave surfaces, and lick, but not suck, the honey from the blossoms. Reaumur has proved that this organ acts as a tongue, and not as a pump.—Kirby.

A useful Remark.

We ought, and must, attend less to the rigid economy of collecting the honey; and more to the preservation of these valuable insects.—Gelieu.

Sweet-wort and Sugar, bad food for Bees.

The cause of the death of some of my bees was my feeding them with wort and sugar, instead of ale and sugar, although they took the former more readily than the latter.—Rev. W. Cotton.

Extent of the Flight of Bees.

Different authors maintain that bees can fly several leagues from their hives. It appears to me that the radius of the circle they traverse does not exceed *half-a-league.*—HUBER.

The bee will travel to the distance of four miles in search of food; but all keepers of bees, who desire to profit by them, should plant to a certain extent, where practicable; for the shorter journeys the bees have to make, the more ample will be their return of honey and wax.—MOWBRAY.

Effect of over-crowding Benches with Hives.

'Tis not good to set many stocks of bees on one bench, because in winter time it may cause them to fight, for by these means they have access on foot to one another's hives, which they will sometimes mistake for their own.—SIR JOHN MORE.

Early Instinct.

No bee has to serve an apprenticeship, for on the first day of its life it can build a cell as well as the most aged bee in the hive.—REV. W. COTTON.

A Friend in need, a Friend indeed.

If you desire to have your bees thrive and prosper, keep them from wind and wet, extreme heat or cold; destroy their enemies; and let them enjoy a sufficiency of food, collected by their own industry, and if there be want in some, timely supply them; and doubt not God's blessing upon your endeavours.—PURCHAS.

A Lesson from parental affection.

Owners of hives are often astonished that at this season of the year (April), when the bees had for weeks preceding put on the most promising appearance, after a few days of rain, they become so weak as to be unable to leave the hive, and continue declining until they at last die. The cause is as follows:—The young bees for a short time previous to their leaving their cells, and for some time after, require being fed with the same regularity that young birds are by their parents; and if the store in the hive be exhausted, and the weather does not permit the workers to collect food sufficient for themselves and brood, the principle of affection urges them to part with what they have, at the expense of their own lives. To prevent this, I make it a rule, that if, during the season of swarming,

it rains for two successive days, to feed all the bees indiscriminately, as it would be difficult to ascertain those only that required it.—Dr. James Howison.

Keep the Hive dry.

If the wet gets into a hive in winter, it will not dry before the summer, and the bees often die, although the hive is nearly full of honey. Whereas if they are kept dry no weather will harm them.—Sydserff.

Ignorant Attention a real Enemy to Bees.

All amateurs who have written on the subject of bees, have spoken of their enemies. Nothing is more prejudicial to them than ignorant attention, their most formidable enemies are perhaps their possessors, who torment them, weaken and kill them, by too much care.—Gelieu.

Materials for Hives.

Bee-hives must be fabricated according to your circumstances, and to the country in which you dwell. If fertile of the cork-tree, useful hives can be made of the bark; these are neither extremely cold in winter, nor hot in summer. If the part abounds in fennel-giant, this is likewise convenient; if you have willows,

knit and join them together like weavers' work; a tree made hollow, or boards, sawn four-square, will do. There are two other kinds of hives, those made of dung and clay, and others made of burnt clay.—COLUMELLA.

Do wild bees live in wooden trees or in trusses of straw? They choose wood. And wooden boxes, if thick enough, are warmer in winter, cooler in summer, freer from insects, and more handy than straw hives.—REV. W. COTTON.

Bees should have a Drawing-room.

Instead of a dwelling of straw, which is like living in a barn, give them a hall, parlour, and, lastly, a drawing-room; this you may do by adopting the collateral plan.—S. WHITE.

Conical-shaped Hives the best.

A hive thrives in proportion to its brood-comb. It is of great importance to assist the hive when it is too weak to keep up the necessary degree of heat; it is perhaps for this reason that bees thrive best in conical-shaped hives.—GELIEU.

Moreton Hive with Hoop.

This hive is made of reeds, and stitched with bramble or willow. It is a cylinder; the diameter is twelve inches; the height six inches. They are best when made upon a narrow hoop with wimble bit holes in it, and a mortise hole cut for the bees to enter.—Isaac.

The Cottage Hive.

The cottage hive has somewhat the form of an egg with a part of the small end cut off. It is more friendly to the bees in respect to warmth in winter, and is therefore better for the bees while breeding in the spring. It has not the inconvenience of the large hives of Dr. Butler, the father of English apiarians.—Isaac.

Observations on Leaf Hives.

When using a hive of this description we previously fix a comb in each frame. Bees must not be visited in such a habitation before their combs are fixed securely in the frames; otherwise they may fall down and kill the bees, or excite that degree of irritation as will expose the observer to be stung. In three days we may begin to operate on the hive; we must open the hives

while the sun is above the horizon, cautiously and without any sudden shock, separating the divisions slowly, taking care to wound none of the bees; breathing upon them is to be carefully avoided. The air which we expire seems to excite their fury, but if bellows are used, the bees are more inclined to escape than to sting.—HUBER.

A Fact well proved.

I have tried hives of various kinds; and consequently have had an opportunity of assuring myself that the success of the apiary depends neither upon the form nor the material, but entirely on the treatment alone.—*Translator of* GELIEU.

Nihil sine Labore.

Nature, a mother kind alike to all,
Still grants her bliss at labour's earnest call.

GOLDSMITH.

Square Straw Hives not good for Collateral Working.

I do not think the collateral system, in square straw hives, can ever answer. The nadir hive plan must be the one, if any, to supersede the old one of swarming and burning.—H. W. L.

Cheap Hives.

Mr. Drewitt, at the Weirs, makes square pasteboard hives at sixpence each; he has a fine stock of bees in a round one of this kind; it has a bell-glass on the top, in which the bees are working.—Rev. W. Cotton.

Form of Straw Hives.

On the 1st of August, 1824, a gentleman observed to me that square straw hives were best. I replied that straw hives round, or square, or any other form, were not equal to those constructed of wood; and that a square hive made of any material did not contain a healthy atmosphere for bees.—Strutt.

Superiority of Octagon Boxes.

An octagon, being the nearest in figure to a sphere is the best form for a hive. Bees in winter lie in a round body in the centre of the hive; a due heat is therefore conveyed to all parts, which could not be the case in a square from.—Thorley.

Which are the best Hives?

Straw hives are the best, because in them the bees do best defend themselves from the cold. They hang

in the form of a globe, therefore the nearer the hive is made to this form, the better, warmer, and safer will they be kept.—Sir John More.

Cover Hives to keep them dry.

The covering of hives should be attended to, not for the purpose of keeping them warm, but dry. In winter the less bees are examined the better; nothing should be attempted that has a tendency to diminish the temperature of the hives.—Huish.

Advantages of Huber's Leaf-Hives.

It is not more difficult to lodge a natural swarm into a leaf-hive than in any other; nor are stings to be dreaded; for one of the most singular and valuable properties attending this construction is, its rendering bees tractable; it is in the facility of opening the frames at pleasure, that all the advantages are concentrated, which I expect in perfecting the economical knowledge of bees.—Huber.

Egg-shaped Hives.

All things considered, and as bees hang together in manner and form of a sphere or globe, therefore the nearer the hives come to the fashion thereof, the

warmer and safer they will be, so that hive is of the best shape that is like unto an egg with one end cut off.—PURCHAS.

The Milk-pail Hive.

Besides an eight-square form, bee-hives are made with hoops like a milk-pail, flat upon the top, but constructed of wood that has no unpleasant smell, or taste. In these the bees delight to live.—*Dictionary of Husbandry.*

Collateral versus Nadir Storifying.

Art is ever most successful when it acts most in accordance with Nature. In bee-keeping this has been shewn by the greater success which has attended our experiments with nadir, than collateral, hives. In two instances where the former have been tried, the bees have instantly began to work, and in a short time have made a surprising quantity of comb.—REV. W. COTTON.

The Bee's Home.

The bees are hived into a middle box (collateral) and never afterwards disturbed, there the queen lays her eggs; there the nurse-bees do their work; there

they lay up honey sufficient to keep them through the winter; in short, it is their nursery, their dining-room, their palace, their home, and like every Englishman's home, their castle, for they must never be disturbed there.—Rev. W. Cotton.

Square Wooden Hives the best.

Whatever may be said in favour of straw-hives, as a cheap resource for cottagers, there is no doubt of the preference to be given to wooden ones, both in point of durability, and as affording greater convenience to the bees, for a square form is better adapted for the economical placing of the combs than any other.—*Bee-Keeper's Manual.*

Observatory-Hives.

I shall repeat that the leaf-hives are indispensable in studying the industry and instinct of bees. I ascribe their tranquillity on opening the hives, to the manner in which the bees are affected by the sudden introduction of light: they appear rather to testify fear than anger.—Huber.

King Charles' Bee-keeper.

Whoever adopts my method, it is necessary that they do first see a bee-house made according to the

pattern of His Majesty's in the royal gardens. I shall, as long as I live, keep by me some of my box-hives, to be seen by all that desire it, and will come to my house (an apothecary's shop). The time I keep them is two whole months, August and September. The honey will not keep much longer, because of the grubs (brood) in the hive.—RUSDEN, Bee-Master to King Charles.

Domestic Duties.

When a bee has completed her loadings she returns to the hive; part of her cargo is devoured by nursing-bees, and the other part is stored in cells. She fixes her two middle and two hind legs upon the edge of the cell, then curving her body seizes the farina with her fore-legs and makes it drop into the cell.—*The Honey-Bee.*

To pitch the waxen flooring some contrive,
Some nurse the future nation of the hive;
Sweet honey some condense, some purge the grout;
The rest, in cells apart, the liquid nectar shut.—VIRGIL.

Rapidity of the Bee's Movements.

The bees often load themselves entirely from one flower, but they work with such prodigious quickness,

that whatever attention you give in observing them, the eye can scarce keep pace with, and ascertain the manner in which they act.—WILDMAN.

Character of Bees.

Bees work for all, watch for all, fight for all; they are styled profitable, laborious, busy, loyal, swift, nimble, bold, valiant, cunning, quick of smell, chaste, neat, brown, and chilly.—SIR JOHN MORR.

Civil Policy of Bees.

Mr. Hunter observes that bees never sting but in the neighbourhood of their property, unless hurt; that they never contend with each other for honey, unless within the boundaries of their own right; but that which they have collected they defend.—*The Honey Bee.*

A Swarm of Bees on a Maid's Head.

In or about the year 1717, a swarm of bees settled on the branches of a coddling tree. A girl was asked to hold the hive. The bees were shaken into the hive, and from it crawled over her, and at last on to her face, I at last found the queen, and placed her into the hive; the bees left the servant; not one of them was killed; nor she in the least hurt, but much frightened.—THORLEY.

A wonderful Cure.

In the year 1761, a large bunch of bees hung outside of a hive; a little boy hooked them down with a stick, and began to cry loudly. His mother ran, and soon cried louder, "that her boy was stung to death." I ran to them, pulled the bees out of his hair, even hairs and all. I plucked out stings from his head to his feet; several out of his tongue; thirteen out and off of one ear. I then rubbed him all over with sweet oil. He went to sleep for several hours; at ten at night he opened his eyes, and appeared much recovered, and he never afterwards complained.(?)—SYDSERFF.

Cure for a Sting.

One of the best cures for a sting is to put a little honey on the wound.—REV. W. COTTON.

I recommend sweet oil and laudanum, in *equal* portions, to be kept always in readiness.—J. MILTON.

Putty kills Bees.

June 2nd, 1836.—About one hundred bees killed, probably by eating putty, with which I had stopped the *cuniculus* leading to the hive. *Memo.*, never to use putty again.—REV. W. COTTON.

Humidity bad for Bees.

The humidity of our winters, added to that which exhales from the bees, and retained by the temperature in the hive, proves of very serious injury to an apiary. —Huish.

Mild Winters and wet Springs not good for Bees.

If the winter be mild, and the weather fine; if March be wet and cold, there will be in April more bees die than at any other time.—Sydserff.

A useful Hint.

Let us endeavour to apply the knowledge we have, rather than lose time in speculations more curious than useful, more calculated to annoy the insect, than assist it in its labour of accumulation.—Strutt.

Party-coloured Hives.

Good painting is a great preservative to box-hives. Forget not to paint the mouths of your hives with different colours, red, white, blue, and yellow, in form of a half-moon, that the bees may know their own home.—Thorley.

The Number of Hairs on a Bee's Leg.

I have looked at hundreds of bees' legs under a glass. Every one of them has just the same number of hairs, viz., ten rows, and sixteen hairs in a row, which makes one hundred and sixty in all; and I quite believe that every bee since the beginning of the world has had this number of hairs on its leg, and no more.—Rev. W. Cotton.

The Five Points, or Bee's Charter.

Be careful to avoid the five evils to bees; namely, hindering of their swarming, obstructing their gathering honey, breaking of their combs, robbing by one another, and never to lose a bee.—Sir John More.

No Advantage in destroying Bees.

The death of a bee most assuredly never tended to promote the prosperity of the hive.

Man has it in its power to multiply at pleasure the families of insects which are useful to him; and may find means of diminishing such as make depredations on his agricultural possessions.—Saint Pierre.

Quantity of Honey required for the formation of Wax.

To form one pound of wax, twenty pounds of honey are required. This is the reason why the strongest swarms in the best honey season, when other hives that have no occasion to build (combs) often gain in one day three or four pounds in weight, seem hardly to become heavier, although their activity is boundless. All that they gain is expended in making wax. This is a hint for those who keep bees, to limit the building of combs. From one ounce of wax bees can build cells enough to contain one pound of honey.—F. W. GUNDLACH'S *Natural History of Bees.*

Value of Wax.

Wax is as good as the choice metal of its colour; it is always a ready-money commodity in London, where it sells from five to six pounds the hundred weight.—SIR JOHN MORE.

The price is now (1843) eight pounds per hundred weight.—J. MILTON.

Wax in the olden time.

Natural wax is altered by distillation into an oil of marvellous virtue; it is a celestial medicine rather than human: for wounds it worketh miracles, and is opposed by the surgeons, although they use it themselves.—Sir John More.

How to make the Celestial Medicine.

Take pure wax, put it into sweet wine; repeat this seven times, add four ounces of red brick; put these into a pot, which fill all round with sand, set it on a furnace. It is marvellous to behold the coming away of this oil. The four elements, air, water, fire, and earth, are in the receiver at one and the same time.—Sir John More.

Queen Elizabeth's Beverage.

The ancient Romans first taught the ordering of bees, and they introduced metheglin into our island. The famous and renowned Queen Elizabeth every year had a vessel of metheglin for her own drinking.—Sir John More.

To make Metheglin.

Take a bushel of sweet briar leaves, a bushel of thyme, half a bushel of rosemary, and a peck of sweet bay leaves; boil these in a copper of fair water, strain all into a vat; to every gallon of water put a gallon of honey, and have ready a kive of new ale; tie at the tap-hole a little bag of beaten cloves and mace. It must stand half a year, before it will be fit to drink.—Sir John More.

Contrivances that have proved of no advantage.

Thick bottom-boards are expensive, and do not answer well; the zinc warps, lets in light, air, and rain; it bends down and makes the passage smaller than is intended. The bees have to go down, then up-hill; they drag rubbish and dead bees to any light they see, and the passage is blocked up at once.—H. W. L.—*My Bee Book.*

The effects of Reaumur's Contrivances.

In my opinion his apparatus removed the bees too much from their natural condition, and then these insects lose their industry and activity, and feebly continue their ordinary labours.—Huber.

How do Bees know one another?

Let a bee fall by accident, or be driven by the wind into a hive not its own, it is seized and put to death. What is their signal of recognition? What is the organ and the instrument? Is it the *antennæ*, or is it by the smell that they recognise each other?—GELIEU.

The Temperature of Bee-Hives.

I have found broods of all ages when the thermometer stood in my hives at about 93°; I have repeatedly made the experiment with the most accurate thermometers. When it rises to 104°, the heat is so much greater than the eggs require, that it is intolerable to the bees; 95° and 97° is the usual temperature of hives in summer, in August. When the thermometer in the open air stood at 94°, it did not rise above 99°. In a fine day of spring, during the tumult which precedes swarming, it rises above 104°, and this heat is intolerable to bees. The entrance, which is constantly very restricted, is the only opening admitting the air, yet it *suffices*. On trial, the atmosphere surrounding 25,000 or 30,000 bees preserved sufficient purity for their respiration.

In one experiment the air of a receiver, taken at different times of a day, proved nearly as pure as

atmospheric air. Ventilation, therefore, is one of the industrial operations peculiar to the working bees. An indirect consequence of ventilation is the elevated temperature of the hive preserved by the bees without any exertion.—HUBER.

As the hive fills so will the thermometer rise to 120°, and even to 130°, before the bees will leave their home. When you discover the thermometer, instead of standing as it generally does at about 80°, rises to 90°, you may conclude that ventilation is then highly necessary.

On the 6th of July the thermometer stood at 102°; on the 10th, in spite of my endeavours to keep down the temperature by merely ventilating, it was standing at 112°.

The thermometer had been standing at 110° for six days previously in the end box; on the eighth day it rose suddenly to 120°.

Ventilate your collateral boxes and bell glasses when the interior temperature is at or above 70°.—*Humanity to Bees.*

A thermometer in a bee-hive has ranged as high as 74° Fahrenheit at Christmas; and Bonner says that he has often seen his hives with young brood in them in the midst of a severe frost. Mr. Hunte found the heat

of a hive vary from 73° to 84° of Fahrenheit. F. Huber says that in a prosperous hive the thermometer in winter commonly stands at from 86° to 88°; and in summer, between 95° and 97°. He has observed it on some occasions to rise suddenly from 92° to above 104°.—*The Honey Bee.*

The interior heat of a bee-hive in summer is commonly from 27° to 29° of Reaumur, which is a warmth necessary for the prosperity of the brood; the bees know in what manner to maintain it at this point. They can endure the heat to 30° or 31°; but at 32° and above that, they cannot support it.—HUISH.

It is enough for us to know that, before swarming, a thermometer introduced into a hive stood at 120°, while the day after the swarm had left it, it stood only at 97°.

As the hive fills, so does the thermometer rise to 120°, or to 130°, instead of standing, as it generally does, at 80°. It suddenly rises to 90°; it stood at 110° for six days, then rose to 120°.—BAGSTER.

From observation, I am inclined to think that the most favourable degrees of warmth for the prosperity of the brood and the comfortable working of the bees, are 75° to 90°, and, in side boxes, 65° to 75°. I have rarely

seen the thermometer higher than 95°. I have known swarming take place at considerably less than this. At a temperature between 95° and 100°, the combs soften so much as to be in danger of falling.

Should the heat of the stock-hive suddenly rise to 90°, open the ventilator. I have found that the swarms issued at a temperature varying from 90° to 95° of internal heat. Some apiarians have named a considerably higher degree of heat as necessary to compel bees to leave their home; but this is an error, and I have proved by experiment that the combs *collapse*, and fall, at a temperature a little above 100°.*—*The Bee-Keeper's Manual.*

A candid Compiler.

Although, gentle reader, I have not given thee any labour of my own, but rather have collected the sayings

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* We can but notice in these statements a very material difference, enough to make us pause before we attempt an interference with their economy of heat. Huber, and I know of no better authority, asserts that at 104° the heat is intolerable to the bees. The *Bee-Keeper's Manual* asserts that, at a little above 100°, the combs collapse and fall down. Now what happens when the heat, as is stated by others, is at 112°, 120°, 130°? We know that water boils at a given heat, and wax also melts at a certain temperature, and collapses, or falls down, at a few degrees only below the melting point.—J. Milton.

and writings of many ancient authors, yet I trust it will be well accepted of thee without offence. For as he that setteth forth unto the view and reading of all men such knowledge as by his long study and experience he hath collected, is worthy to have his due reward; even so he is not to be discommended who, painfully revolving the leaves of volumes of books of many divers ancient matters, reduceth all into one little treatise; for the commodity and profit of the unlearned; for whose sakes I have travelled into the translation of this matter about bees; a thing very rare and seldom seen in the English tongue.—Preface to HYLL *on Bees*, 1568.

Scarcity of Books on Bees.

On inquiry, very few even second-hand copies of former authors' works on bees are on sale, and only two new ones.—BAGSTER *on Bees*, 1838.

CONCLUSION.

In my instructions for the keeping of bees and management of hives, I have endeavoured to be as concise and plain, as the nature of the subject would permit. My observations and remarks are made with a view of directing the cultivators of bees, to consider the advantage and satisfaction derivable from the pursuit of a higher and more humane system. For we ought not to cultivate bees merely from a love of gain; should this, however, be our primary object, there is no hive which apparently favours so much as the common straw hive, and brimstone. The hive, for its cheapness and readiness with which it is procured; the brimstone, for its certain and direful effects. But this hive, with its slovenly management, favours indifference as to what becomes of the bees more than any other beside. It allows the possessor to continue the worse than barbarous practice of suffocation; the apology is, they cost nothing; therefore let them take care of themselves. I hope when the enlightened cultivator engages in the study of bees, he will take a more extensive and better view of the subject, and will examine it philosophically. For, considered as a branch of Natural History, does it not conduce to soften our feelings, and to produce greater love to all

the animated beings around us? It is impossible to be engaged in the study of any of them, without our feelings becoming more refined. I consider that the example of an enlightened cultivator of bees, excites more influence on those around him, than could be produced by volumes written on the subject.

"A gentleman, one who takes a great interest in bees, while on a visit in Essex, passed a cottage having a row of bee-hives in front; he inquired of the owner, how he disposed of the honey, and was told that the shop-keepers in the town bought it at sixpence per pound, and deducted it from the amount standing between them. The gentleman told the cottager that if he would reserve him forty pounds, taken without killing the bees, he would give him forty shillings for it. This proposal was of course gladly accepted."—Is not this a good practical plan of inducing the cottager to take more pains with his bees? Does it not also insure to the purchaser a better article, and of more real value? Is not the benefit derived mutual? I am often asked which is the best hive, and of what material it should be composed; I say, with Gelieu, *it is not of so much importance what form or material we compose our hives, as the attention we bestow upon the bees in it.*

The two essential qualities of a straw hive are, that it absorbs the humidity, and is also a non-conductor of

heat. But are not these properties obtainable also in well-constructed wood hives? This must be allowed, but the first cost of these is greater; therefore we suffer ourselves to be controlled by price, and until this prejudice is removed, little good can be effected by the many. I am, however, by no means an advocate for expensive "apparatus," or "bee machinery." On the contrary, I have always studied how to simplify my hives, and to make them answer the purpose with the least possible expense.

The use of the thermometer has lately been revived in bee culture; this piece of "bee apparatus," or "bee machinery," I have not found of any advantage, neither does it, in my opinion, assist the bees. "Nature is perfect in all her works." Man, in his contrivances, should therefore avoid all unnecessary interference with "the beautiful order of the arrangement." Those who practise "ventilation," as it has been termed, do not obtain honey of a finer quality, or in larger quantities; and possibly the interference with the internal heat of the hive, may be of great annoyance to the bees. I do not maintain that the use of a thermometer, when placed in the hive by the hand of a skilful person, is detrimental; but on the contrary, if it is used by an inexperienced person, one who has not studied the economy and the order of arrangement among bees, and who only takes it up as a toy, it will then, I think, be attended with effects

calculated to retard the prosperity of the apiary. We should avoid all unnecessary experiments, such as smoking, driving, or ventilating. Of what use is an heterogeneous mass of bees, brood, wax, and bee-bread, thus obtained? In the various extracts which are given in this work, will be seen the direful effects of the use of the fungus puff ball, &c. The list of writers given in the Appendix, must not be regarded as perfect; nevertheless, I have used all the means at my command to render it so by consulting the works in the British Museum, Watts' Bibliotheca, Booksellers' Catalogues, &c., in addition to my own extensive collection. If in this, my feeble attempt, I should succeed in promoting improvement in bee-culture, and removing any false prejudices or popular errors, then will my exertions not have been in vain, and my satisfaction, nay, my joy, in the result will indeed be great.

APPENDIX.

A LIST OF ANCIENT AUTHORS UPON BEE-HIVES, BEES, AND THEIR PRODUCTIONS.

Agrippa, Cornelius
Agrius, or Thassius
Albertus
Aldrovandus
Alexander the Great
Aquinas, Thomas
Aristodemus
Aristomachus
Aristophanes
Aristotle
Aristoxenus
Auicen
Baubinus
Bellonius
Cantiphratanus
Cardanus Hieron
Cato, M.
Ceci, Prince Frederick
Celsus
Cicero
Claudius Cæsar
Columella Junius
Columna Fabius
Democritus
Didimus
Diodorus Siculus
Diophanes
Dioscorides
Florentinus
Galen
Gorrheus
Guilhelmus de Conchis
Herodotus
Hesichius
Hippocrates
Homer
Horace
Hyginius
Isidore
Justine
Lebanon, John of
Libanius, Andreas
Macrobius
Martial
Mathew, Peter
Melissus
Menecrates
Menus
Misald
Nassus liber Pater
Olaus Magnus
Ovid

Palladius Rutilius
Pappinus
Pappus
Paul Ægineta
Philiscus
Philistrius
Plato
Pliny
Plutarch
Polidore
Publius Maro
Pythagoras
Quintilian
Seneca
Servius
Socrates
Solin
Solomon
Strabo
Theophrastus
Toxites
Valerius Cordus
Varro { the first who mentions hives for bees.
Virgil
Xenophon

A

CHRONOLOGICAL LIST

OF

BOOKS AND WRITERS UPON THE BEE.

1405 A Zoological Dictionary in Arabic
1529 Maison Rustique
1539 Ruccellai (a poem)
1550 Galissardus
1556 Stanhoff
1563 Pictorius
1568 Hyll or Hill
1572 Anonymus
1574 Hyll
1576 Gesner Conrad
1577 Scaliger
—— Googe
1579 Hyll
1581 Fleming
1586 Hyll
—— Torres, L. M.
1593 Southern
—— Hyll
1596 Picus
1597 Clutius
1599 Aldrovand
1600 Scaliger
—— Stevens
1601 Clutius
1608 Hyll
1609 Butler
—— Cagniard
1613 Markham
1614 Penry, Dr.
1615 Lawson
1616 Columna
1617 Baricelli
1618 Clutius
—— Lawson
1622 Bacon, Lord
1623 Butler
—— Lawson
1626 Lawson
1627 Cantus Pratanus
—— Maison Rustique
1629 Malynes
1631 Lawson
—— Kepler
1634 Butler
—— Mouffet
—— Levits
1637 Remnant
1642 Aalborg
1645 Alphonso
—— Columella (Husbandry)
1646 Montford
1648 Clutius
—— Lawson
1649 Montford
—— Lawson
1650 Descartes
1651 Hernandez
1652 Salzmann
1654 Wren, Sir C.
1655 Mew
—— Hartlib
1657 Purchas
—— Mainz

1658 Evelyn
1660 Grutzman
—— Cregutus
1662 Goedart
1668 Turmius
1669 Anonymus
1670 Willughbey
—— Hire, de la
1671 Reed
—— Malpighi
—— Lister, Dr.
1672 Grew
1673 Butler
1675 Gedde, Dr.
1676 Lawson
—— Warder
—— Gedde, Dr.
1678 Worlidge
1679 Rusden
1680 Grutzman
1681 Grew, N.
—— Dring
1682 Lister, Dr.
—— Wheeler
1683 Worlidge
1685 Goedart
—— Garden, Geo.
1687 Thevenot (Travels)
—— Cleyer
—— Mentzel
1688 Turneius
1690 Butler
1691 Worlidge
1692 Cassini
—— Maillet
1693 Labat
1694 Reyger
—— Valentini
1696 Houghton (Husbandry)
1699 Allen
—— Hatton
—— Horsfield, Thomas
1700 Boerhaave
—— Maundrell (Travels)
1700 Homberghs
—— Mayerne
—— Poncet, Dr. (Travels)
1701 Reftelius
1703 Hire, de la
1705 Clutius
—— Poupart
1706 Evelyn
—— Duhamel
1707 More, Sir John
1708 Tournefort (Travels)
1709 Bon
1710 Riem
—— Malpighi
1711 Lisle, de
1712 Maraldi
—— Boerhaave
1713 Rays, Willughby
—— Rusden
1720 Gedde, Dr.
—— Warder, Dr.
—— Derham
1721 Gedde
1722 Leuwenhoeck
—— Gedde
1724 Fabricius
1726 Dictionary of Husbandry
1727 Vaniere
1728 Reaumur
—— Triewald
—— Buffon
1729 Maraldi
1730 Merian
—— Southall
—— Reaumur
1732 Pluche, Abbé de la
1733 Breynius
—— Dublin Society
—— Gmelin
1734 Trew
—— Tract Curieux des Mouches à Miel
—— Mortimore (Husbandry)

1735 Du Halde
—— Labat
1738 Swammerdam
1739 Koenig
1740 Duhamel
—— Homboldt (Travels)
1741 Degeer
—— Maclawrin
1743 Dercum
1744 Bazin
—— Thorley
—— Degeer
—— Natural History of Bees
—— Reaumur
—— Histoire Naturelle des Abeilles
1745 Bonnet
—— Wilhelmi
1746 Gelieu
—— Baster
1747 Bazin
—— Roesel
—— Falchini
—— Schubarths, J. R.
1750 Koenig
—— Dobbs
—— Degeer
1752 Hasselquist (Travels)
1754 Duhamel
—— Templeman, Dr.
—— Abbé Jessieu
—— Prouteau
1755 Stiegletz
1756 Kalm (Travels)
—— Palteau
—— Schiotte
—— White, S.
—— Fontenelle
—— Bourdonnaye
1758 Bromare, de
—— Simon, J.
—— Swammerdam
1759 Martini
1760 Stiles, Sir R.
1760 Gleditsch
—— Schiotte, D.
—— Niebuhr
—— Conrad Gesner
—— Hill, Sir John
1761 Schirach
—— Maroni
1762 Modeer
—— Koenig
—— Walpurger, J. G.
—— Solander
—— Leche
—— Geoffrey
1763 Dublin Society
—— White, S.
—— Dodsley
—— Mentelli
—— Abbé Boissier de Sauvages
—— Duhamel
1764 Vicat, Madame
—— Modier
—— Schaeffer
—— Collinson
—— Don Ulloa (Voyages)
1765 Daubenton
—— Modeer
—— Scopoli
—— Warder
—— Baster
—— Turner
—— Overbeck
1766 Mills
—— Ducarne
—— Hasselquist
—— Della Rocca
—— Kastner
1767 Pallas
—— Wilhelmi, J. G.
—— Bradley (Husbandry)
—— Dublin Society
—— Bondaroy
—— Lehmann
—— Schirach

1768 Hattorf
—— Darwin, Dr.
—— Schirach
—— Wildman
—— Hagstrom, J. O.
—— Homeyers
—— Lisle, de
—— Pennant
—— Boswell
1769 Riem
—— Gleditsch, J. G.
—— Vicat, Madame
—— Zeiss
—— Schwan, C. F.
—— Riem
1770 Ludwig, C. J.
—— Wildman, Thomas
—— Ultjesfort
—— Vogel
—— Wilhelmi
—— Gleichen
—— Crèvecœur
—— Franconian Apiarian Society
—— Pingeron (a Poem by Ruccellai)
1771 Ducarne de Blangy
—— Fontana
—— Overbeck
—— Richardson
—— Boisjugan, M. de
—— Bonnet
—— Pemberton
—— Duchet
—— Lapoutre
—— Schirach
1772 Curtis
—— Herold
—— Niedhart
—— Zehnpfenning, J. A.
—— Stienmetz
1773 Sprengerus, B.
—— Gullander Ph.
—— Hagstrom
1773 Cat, le
—— Neidhart, J. M.
—— Segerus, J. G.
—— Schwan, C. F.
1774 Vogel
—— Bierkander
—— Eyrich
—— Kruenitz, J. G.
—— Schirach
—— Steinmetz
—— Goldsmith
—— Herold
—— Franconian Apiarian Society
—— Janscha, A.
1775 Albrecht
—— Bonnet, C.
—— Spitzner, J. E.
—— Goeze
1776 Limburgh, C. F.
—— Kortum, C. A.
—— Wildman, Thomas
—— Algren
—— Barbotteau
—— Riem
—— Steinmetz
1777 Debraw, J.
—— Anderson, J.
—— Sparmann
—— Fleischer, E.
1778 Voigt
—— Fontana
—— Duchet
—— Polhill, N.
—— Dedekind
1779 Niesen, C.
—— Scoeffer
1780 Christ, J.
—— Fritze
—— Eyrich
—— Blumenbach
—— Keys, I.
—— Riem
1781 Lhuillier, S.

1782 Hoy, R.
—— Nevilau
1783 Bromwich, B. J.
—— Paley, Dr.
—— Müller, J. M. C. von
—— Lambert, Father
—— Christ, J.
—— Mastaliez
1784 Spalanzani
—— Bazin, N.
—— Bierkander
—— Stumpf, G.
1785 Sparman
1787 Swedrus
—— Possl, J.
1788 Maraldi
—— Gmelin
—— Stoll
1789 Carlson
—— Ladislaus, Reichsele von
—— Isaac, J.
—— Lane, J.
—— Hunter, J.
—— White, Rev. Gilbert
—— Audebert
—— Olivier
—— Dubost
1790 Della Rocca, Abbé
—— Barton, Dr.
—— Bonnet
—— Manley
1791 Christ, J.
—— Bartram (Travels)
—— Bosc
—— Morris
1792 Aldermark
—— Hunter
—— Almanack for Bee Friends
1794 Donovan
1795 Lewin
—— Bonner, J.
1796 Keys, J.
—— Bonnet, C.
1796 Huber, F.
—— Hints for promoting a Bee Society
1797 Maraldi
—— Harasti Gaetano
—— Voigt
—— Barrow (Travels)
1798 Anderson, Dr.
—— Copons, J., Marquis von
1799 Silvestre
—— Latreille
—— Vauquelin
—— Cordier, E.
—— Hubbard
—— Murphy, A. (Poet)
—— Isaac, J.
1800 Maxwell, R.
—— Olivier
—— Schellenberg
—— Dubost, J. F.
—— Frederick, J. P.
1801 Wildman, D.
—— Huber, P.
—— Fabricius
—— Haussmann
—— Latreille
—— Lombard, C. F.
—— Kirby, W.
—— Serain, P. E.
1802 Savigny
—— Vauquelin
1803 Isaac, J.
—— Bienayme, M.
—— Cramer, J. G.
—— Bostock, Dr.
1804 Wolff
—— Beville, P. C. G.
—— Irvine, Dr.
—— Huber, F.
—— Riem
—— Matuschka
—— Hand-Book of Bee-Keeping
—— Latreille

1805 Histoire de l'Abeille Commune
—— Lombard, C. F.
1806 Huber, F.
—— Evans, Dr. (Poet)
—— Traite pratique de l'Abeille
—— Baunier, Saint
—— Schreibers
1807 Knight, T. A.
—— Spinola
—— Watckenaer
1808 Engel
—— Huber, F.
—— Vauquelin
—— Lombard, C. F.
—— Cadet
1809 Azzara
—— Ramdhor
—— De la Lawze, C. F. A.
—— Latreille
1810 Kirby, W.
—— Virey
—— Olivier
—— Koster, H.
—— Feburier
—— Spitzner, J. E.
—— Bosc
—— Blumenbach, D. J. F.
1812 Burrel
—— Blondelu
—— Buffon
—— Dedekind, L. C.
—— Knight, E.
1813 Evans, Dr. (Poet)
—— Ducouedie, P.
—— Denys de Montford, P.
1814 Keys, J.
—— Hove, A. P.
—— Huber, F.
—— Fallen
1815 Kyber
—— Huish, R.
—— Herold
1815 De Grave, P. F.
1816 Hodgson, H. T.
—— Bosc
1817 Leach
—— Fabricius
1818 Germar
—— Basil Hall (Travels)
—— Howison, Dr.
—— Western Apiarian Society
—— Paxton
—— Espinasse, J.
1819 Sahlberg
—— Wildman, D.
—— Smith, Sir E.
1820 Christ, J. L. von
—— Talbot (Travels)
—— Dunbar, Rev.
—— Huish, Robert
—— Basil Hall (Travels)
—— Kuntzmann
1821 Buffon
—— Latreille
—— Huber, F.
1822 Thunberg
—— Nagel, H.
1823 Milton
—— Fischer
—— Isis
—— Worth
—— Heuvel
—— Hardwick
1824 Mowbray, B,
—— Descourtils
—— Saint Hilaire
—— Lehmann
—— Guilding
—— Macleay
1825 Duvau
—— Lombard, C. F,
—— Dalman
—— Desormes
1826 Martin, J. and A.
—— Kittel

1826 Fallen
1827 Bevan, Dr.
—— Wolond
—— Laplace
—— Fremiet, M. H.
1828 Martin, A.
—— Feburier
—— Wiston, M.
—— Heineken
—— Radouan, J.
—— Hardwick
—— Treviranus, G. R.
1829 Espaignet
—— Guilding
—— Fallen
—— Fontenay
—— Ehrenfels, J. M. von
—— Bee Preserver
1830 Busch, F. B.
—— Blot
1831 Cobbett, W.
—— Lofebvre
—— Say
—— Serville
1832 Brandstein
—— Larpote, de
—— Dahlbom
—— Lepelletier
—— Fonscolombe
—— Sinclair, Sir John
—— Child, Mrs.
—— Cottager's Guide
—— Schummel
—— Brougham, Lord
—— Hahn
1833 Geoffroy, St. H. J.
—— History of the busy Bee
1833 Dufour
1834 Cottager's Manual
—— Laport, de
—— Fonscolombe
—— Westwood
—— Lewis
—— Burmeister
1835 Howatson
—— Nutt, T.
—— Loudon
—— Dahlbom
—— Boisduval
1836 Fargeau, Saint
—— Bertin, M.
—— Shuckard, W. E.
1837 Gelien, de J.
—— Nutt, T.
—— Hoffman, G. F.
—— Groves, W.
1838 Rendu, M.
—— Cotton, Rev. W.
—— Bagster, S.
—— Payne, J. H.
—— Bevan, Dr.
1839 Bee Master and Bee Friend
—— Christ, A. von
—— Smith, R.
—— Taylor, H.
1840 Naturalist's Library
1841 Newman, E.
1842 Cotton, Rev. W.
—— Huish, R.
—— Chambers, W. and J.
No date. Comfort to Aristeus
—— The Cottager's Hive (Kent)

My object in compiling this list of the names of writers and books, with dates, is to show at one glance that scarcely a year has elapsed without some work on Bees issuing from the press; this I think is another proof of the great interest entertained for the subject.

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